RAILROAD GAZETTE

FRIDAY, AUGUST 16.

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Starting a Locomotive by an Auxiliary Engine.

PATERSON, N. J., Aug. 9, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your edition of to-day Mr. Booth urges the desirability of putting both the cranks of a locomotive on one and the same centre line, instead of the usual 90 degrees apart, with a view to more perfect balancing. Foreseeing the objection which would at once be raised to such an arrangement, namely, the impossibility of starting should the cranks happen to stop on a centre, he goes on to say, in effect, that the use of an auxiliary engine to "bar" the engine round, as used in stationary practice, would be a complete solution of the difficulty.

A little consideration will, I think, convince Mr. Booth that his assertion will not bear inspection. In mill work the engine at starting has only a very small fraction of its regular load to overcome—the friction of the shafting merely—whereas a locomotive has to exert its greatest power at that time. Consequently a "barring" engine that would carry an engine attached to its train over its centres would have to be of equal power to the engine itself. W. F. DIXON.

Indicating Locomotives.

WATERTOWN, N. Y., Aug. 7, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The article on "Indicating Locomotives" in last week's issue, describing Mr. Lyne's special rig, closes with the remark that diagrams taken with long pipes at high speeds are unreliable.

By "long pipes" and "cylinder heads," I judge that Mr. Lyne referred directly to the apparatus used on Central Vermont Engine 88, illustrated in your issue of July 12. Mr. Lyne's reference to disfiguration of engine and the too much (?) work in running pipes from heads to top of chest are secondary matters. The prime object sought in any test is accuracy, first and last, but in no test more than on a locomotive must convenience be sought for in obtaining accurate results. After having thoroughly tested this much mooted question of long pipes for locomotive indicating, by placing indicators both on top of chest and as near the head as possible on the same cylinder, and comparing cards taken in both positions, I have not been able to discover any difference between the two, perceptible either to the eye or with the planimeter.

Long pipes, as shown in the article of July 12, give no trouble, because they readily drain themselves, and there is no chance for the accumulation of a sufficient quantity of water to give trouble in the indicator. Pipes placed in a horizontal position, as in Mr. Lyne's system, make good drip pockets, and the water which collects goes out through the indicator when it becomes necessary to take a card, and time is lost in waiting for this water to escape. For this same reason, short lengths of horizontal piping on stationary engines have been discarded by careful engineers. Therefore, with well-covered ¾-in. pipes having easy bends, it can be safely said that there are no inaccuracies with the chest system and with proper use of the indicator; the diagrams obtained are as reliable at any speed as any shorter system of piping.

No unreliability appearing, then, with long pipes, let us look at the disadvantages of Mr. Lyne's system. No one will admit that an operator can work on an express train with the rapidity, ease and comfort in Mr. Lyne's cramped position, on bended knee, with the use of only one hand at the indicator, that one can in an easy position with both hands at his command, and with the assurance that his head will not be taken off by a bridge; in other words, with nothing to look out for but to take diagrams. Think of making a run of 150 miles, taking cards every minute steam is used, and noting data that the operator alone should do, in such an awkward position, and keeping this up for ten days. Without frequent and unhampered indicating no reliable results can be obtained in tests conducted as were those on the Central Vermont.

Mr. Lyne thinks that attaching pipes to the cylinder heads has retarded rather than assisted locomotive indicating, his principal argument being that unless we adopt a design similar to his, we have destroyed the beauty of the engine and have complicated the reducing motion tremendously. Let us see. Mr. Lyne's rigging has 18 distinct pieces up to drum cord, all liable to rattle loose in continued service The arrangement illustrated, used on the Central Vermont, consists of only six pieces, and is applied to any engine by simply bolting the pendulum bracket to running board and screwing the stud into crosshead, and, when once thoroughly put up, stays there for any amount of mileage. Moreover, this rigging can be applied to any engine, and when done with can be taken off by any experienced man, without leaving any visible scar, while with Mr. Lyne's the two plugs are always present to trouble the wipers, and they certainly disfigure the neat, smooth appearance of the cylinder.

After several thousand miles of locomotive indicating, we declare ourselves firmly in favor of pipes on chest cover, and consider it accurate beyond dispute, besides being so convenient that no obstacles are thrown in the way of obtaining accurate and reliable results.

H. G. MANNING.

The Starting Power of Compound Locomotives.

SYDNEY, NEW SOUTH WALES, July 8, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I am glad to see from the columns of the *Railroad Gazette* that the subject of the compound locomotive is exciting considerable interest at present, and that the performance of the Webb compound on the Pennsylvania has shown that there are great possibilities in the application of the compound principle to locomotives.

It is not surprising that some misapprehension appears to exist as to the maximum power which a compound is capable of exerting in starting, and it is perhaps well to examine carefully the two main factors which govern the starting power of compound locomotives. I would, however, first point out the fallacy of a well-known expression which has been used in this discussion, "the weight on drivers is the measure of the power of a locomotive." This is only half a truth, or rather it is an axiom not capable of general application, and is especially untrue of express engines.

An example will make this clear. Take a well-proportioned American engine with 69 in. drivers and 18 by 24 cylinders, which, when running fast and hauling a heavy train, can make plenty of steam. Convert this same engine into a mogul, by substituting a front pair of 69 in. drivers for the hind truck wheels. The adhesion weight is thus increased about 50 per cent., but no one will contend that the locomotive thus altered will haul 50 per cent. greater load. The only difference will be that the tendency to slip at starting will be lessened. The hauling power is not increased for the simple reason that the cylinders and boiler pressure, etc., remain unaltered, and, therefore, the pressure delivered on the main pins remaining the same, the engine, though altered, can do no more. Being well proportioned, and having a reasonable adhesion weight, she did not often slip when a four-coupled engine, and the only effect of adding the additional drivers has been to diminish a slip which was never detrimental. Let us go, however, a step further in our endeavor to obtain a more powerful engine, and increase the area of the cylinders 50 per cent. A pair of 22 by 24 cylinders will give almost exactly 50 per cent. greater tractive force, and as the proportion of tractive force to adhesion remains unaltered—both having been increased 50 per cent.—the engine will now start a train 50 per cent. heavier. An attempt, however, to run that train at the old speed soon shows that something is wrong. The boiler, naturally, will not make 50 per cent. additional steam, and the heating surface must be increased approximately in the same ratio as the cylinders and adhesion weight.

The moral, obviously, is that the hauling power of an express locomotive depends primarily on three main factors: the steaming capacity, the cylinder power and the adhesion weight. It is further evident that the relative value of these factors is in the order in which they are named. If the pressure of steam cannot be maintained, large cylinders and great adhesion weight will be of little avail at high speeds, while the deficient power of small cylinders may be counteracted by working the engine "heavily" or "well down" in the corner, and similarly a tendency to slip can be almost entirely prevented by good sand delivered in the right place.

The case as regards freight engines is somewhat different, but I gather that the discussion on compound locomotives is for the present confined to the application of the compound principle to express locomotives, and, therefore, it is, perhaps, well to point out briefly that the power of such engines does largely depend upon their ability to make steam, and is by no means governed or limited by their adhesion weight.

The bearing of this digression upon the subject of my letter will soon, I trust, be apparent. The two types of express compound locomotives which are best known, the Webb and the Worsdell & Von Borries, have both plenty of adhes on (about 68,000 lbs.), and therefore in this respect do not differ materially from the latest types of American express locomotives as illustrated and described in your pages. The cylinder powers of the best known examples of this type do, however, differ considerably, and it is possibly owing to this fact that some divergence of view has been expressed as to the relative starting power of simple and compound locomotives. As the respective inventors have evidently different ideas as to the proper amount of tractive force which a compound should possess for a given service, it is not surprising that ordinary mortals should be puzzled as to whether a compound locomotive can exert as much tractive force as a simple engine of similar general proportions.

This difficulty is not lessened by the fact that the Webb and Worsdell & Von Borries systems differ widely in the mode adopted of starting the engine. Mr. Webb's engine possesses the cardinal feature of always working compound under all conditions; that is, the low-pressure cylinder can only receive steam that has already done work in the high, while in the engines designed by Messrs. Worsdell & Von Borries, the steam under certain conditions is admitted direct from the boiler to the low-pressure cylinder. It is evident that when this starting valve is in operation, the engine is not working compound. It is also, however, manifest that the engine can exert a very considerable starting power, greater than the maximum power when fairly moving and the starting valve no longer operative. The high-pressure piston at starting has the full boiler pressure without any back pressure, while the low-pressure piston has the maximum allowed by the safety valve used in place of a waste-water cock, and attached to each cylinder cover. When once fairly started, the high-pressure piston will, as in all compound engines, have a considerable back pressure, and the low-pressure cylinder can, owing to the safety valve, never have a greater pressure than at starting. This I consider shows conclusively that there is nothing in the Worsdell & Von Borries principle to prevent the exertion of full power in starting.

Your readers may, however, be surprised to hear that I am informed on excellent authority that one of their engines when tried on a heavy grade would only take up 9 cars while a precisely similar, but non-compound, locomotive took up 14 cars of the same type. This great difference in hauling power is not (as I trust I have shown) due to any defect in principle, but to a defect (?) in the proportion of the size of the cylinders.

A comparison between the main line express compounds used by Mr. Webb and Mr. Worsdell will make this clear. These engines have very similar adhesion work to do, and have very similar weight. Their main proportions are given below:

	Webb.	Worsdell.
High-pressure cylinders	two 14 × 24	one 18 × 24
Low-pressure cylinders	one 30 × 24	one 26 × 24
Drivers, diameter on tread	75 in.	80 in.
Boiler pressure	175 lbs.	170 lbs.

A convenient method of comparing the tractive force of these engines is to take some arbitrary co-efficient of the boiler pressure and apply it to the high-pressure cylinders in the usual method adopted for determining the traction force of ordinary locomotives. A similar calculation may be made for the low-pressure cylinders. As the ratio of the cylinders to one another is very similar in both engines, the same co-efficients should apply, and this method of comparison should be fair, and if not giving trustworthy absolute results, should, at any rate, give reliable comparative values. As regards ordinary locomotives, I believe the present writer was the first to suggest that 85 per cent. of the boiler pressure should be taken as the measure of the usual maximum average pressure in the cylinder during the stroke. This figure was subsequently adopted by the Master Mechanics' Association. Our experience with compounds is at present too limited to enable the adoption of any definite figure for the maximum percentages of boiler pressures in the high and low pressure cylinders, respectively. The figures below, therefore, must be taken as merely rough approximation, needing revision by a careful examination of diagrams when the proportions of cylinders, ports and valve gear for compound locomotives are better understood. I believe, however, that results fully equal to the figures given below have been obtained in ordinary practice. Assuming that in full gear the average pressure in the high-pressure cylinder is 60 per cent. of the boiler pressure and 30 per cent. in the low-pressure, the figures for the two engines work out as follows:

WEBB.

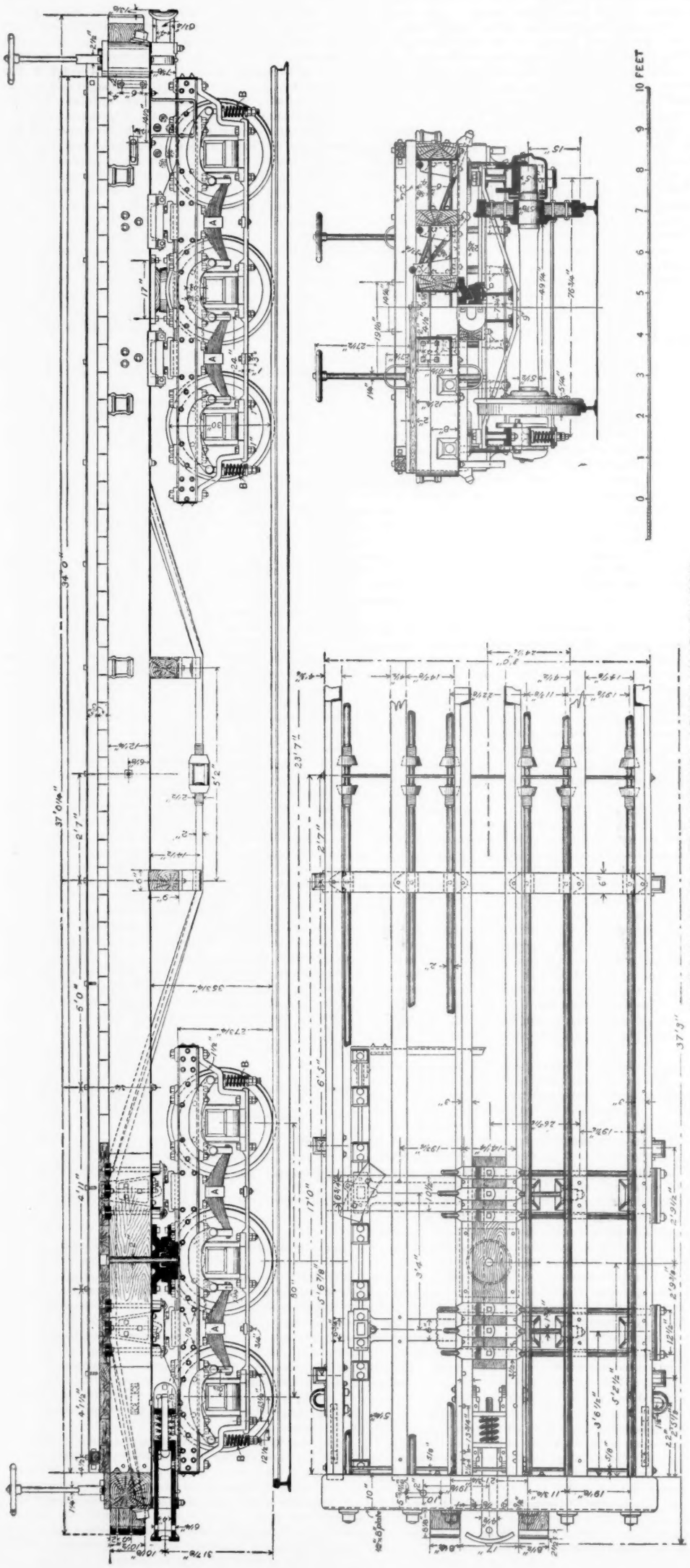
		Tractive force at rail.
High-pressure cylinders	$\frac{175 \times 60 \times 14^2 \times 24}{100 \times 75} =$	5,586 lbs.
Low-pressure cylinder	$\frac{175 \times 30 \times 14^2 \times 24}{100 \times 2 \times 75} =$	7,560 lbs.
Total		13,146 lbs.

WORSDELL & VON BORRIES.

High-pressure cylinder	$\frac{170 \times 60 \times 18^2 \times 24}{100 \times 2 \times 80} =$	4,957 lbs.
Low-pressure cylinder	$\frac{170 \times 30 \times 26^2 \times 24}{100 \times 2 \times 80} =$	5,171 lbs
		10,128 lbs.

Applying the same coefficients to engines with similar boiler pressure and ratio of cylinders, it appears that the difference in the diameter of cylinders and wheels is equivalent to a difference of about 30 per cent. in tractive power. If compounds designed by most eminent mechanical engineers for similar work differ so widely from one another in power, the task of comparing the power of a compound with that of an ordinary locomotive seems indeed difficult. It is possibly somewhat unfair to make the comparison with the figures I have given, because it is very possible that my 60 and 30 per cent. may be too low, while the 85 per cent. is generally accepted as a correct value for ordinary non compound engines.

An express locomotive which will exert a tractive force of 13,000 lbs. when working with a three-fold expansion is undeniably a powerful and economic machine, and manifestly could compete on a long grade at an immense advantage with an engine which could only obtain the same amount of tractive force with a 1¼ or 1½-fold expansion. The peculiarity of the action of the Webb engine in starting has often been explained, and I need not dwell on it here, but it appears that except when the low pressure crank is on the centre, the Webb engine should start as well as any other engine, and certainly exert its full power in starting. The Worsdell



& Von Borries type can manifestly exert *more* force for the first stroke than at any other time, and therefore there is nothing but their small cylinders to hinder the Worsdell & Von Borries compounds from exerting as much power in starting as ordinary non-compound locomotives for the same service.

It is well, moreover, to note a few facts which may be regarded as fairly proved in European practice:

1. Compound locomotives have proved more economical of fuel than non-compound engines of similar adhesion, weight and boiler power.

2. Both the types cited above have done well in hauling fast and heavy trains, and have run a large mileage with an economy of ful y 10 per cent. in fuel.

Now I wish to point out the essential reason why their need be no fear of the compound locomotive being inferior in starting power. As shown in the beginning of this letter, it is easy to increase the adhesion weight of ordinary locomotives, but any corresponding increase in cylinder power means an increased demand upon a fully taxed boiler, and this really limits the power we can obtain, especially in a fast-running locomotive. As the compound, however, develops the same power with less fuel, it is obviously open to us to still use the same amount of steam as before, but by compounding obtain increased power. This being a fundamental truth underlying the details of proportion, we have every ground for hope in the future development of the compound locomotive. It's proportions have been perfected by the usual process of trial and error, and details may need some improvement; but experience and further study of the problem should crown and complete the success which the compound locomotive has already undoubtedly achieved.

D. H. NEALE,
Mechanical Engineer,
New South Wales Government Railways.

Lehigh Valley Fifty-ton Car.

The cuts shown herewith illustrate an exceptionally strong car built at the Packerton shops of the Lehigh Valley. Master Car Builder John S. Lentz furnishes the following dimensions:

Length of car out to out of end sills, 35 ft. 8 in.; width of car out to out of side sills, 8 ft.; height from rail to top of floor, 4 ft. 5¼ in.;* extreme length over dead blocks, 37 ft. ¼ in.; the longitudinal sills are six in number, of Southern pine, 4½ × 12 in., the two middle and the outside sills are reinforced with channel bars of iron 12 in. wide and $\frac{5}{16}$ in. web. There are four body bolsters composed of channel bars 10 in. wide and ⅜ in. web, trussed with eight 1¼ in. iron rods, and four 1⅜ in. rods, extending to end of bolster through a heavy cast-iron plate. The end sills are 10 × 12. in. of oak, faced with wrought-iron plates 1½ × 8 in., which serves as a compression plate for the truss rods. The body is trussed with six 2 in. rods, upset to 2½ in. at the ends.

The trucks were designed by Superintendent A. Mitchell, of the Wyoming division. The two 6-wheeled equalized trucks have 33 in. steel-tired wheels with journals 5 in. diameter and 9 in. long, and bearings of phosphor-bronze. The spiral springs in the trucks are double.

The special purpose in building the car was to provide for the transportation of heavy machinery built in England, which is delivered to this road at Perth Amboy, N. J., for the Bethlehem Iron Co., Bethlehem, Pa. In one instance it carried a load of 122,724 lbs. without any perceptible sag in the body, and without any indications of heating. The weight of the body is 21,700 lbs, and of the trucks 23,800 lbs.; total, 45,700 lbs.

Passenger Cars at the Paris Exhibition.

It is rather remarkable that at this exhibition there is scarcely a full gauge car with wooden sills. Nearly all have iron or steel sills, and in most cases the sides of the passenger cars are cased with thin iron or steel plates. The metal plating is preferred by reason of its smoothness and the superior polish which it takes with a minimum of trouble for the painters. The sills of the cars are almost without exception of rolled channels, with a few cross and diagonal braces of rolled I beams. The tendency toward the American type of car is decidedly marked. It appears in the many combinations in varying proportions in one car of the purely American and the purely European form of construction and arrangement of seats and compartments. However, in all this variety, the seclusion of the first from the second, the second from the third and the third from the fourth class of traveler is preserved. There are some advantages in this to the railroad companies at times. For instance, the through lake boats in Switzerland are run in close connection only with the first-class train, which carries no second, third or fourth class passengers. In this way a majority of those passengers who would otherwise travel second or third class are compelled, in a measure, to pay an additional cash fare, which they will do rather than endure a delay of two hours for the very, very slow way train to come along. If they wait they stay in the station, with a constant temptation to enter upon a railroad "table d'hote," or purchase some of locally branded mementos which, by the way, are, in fact, made generally in the traveler's own state. Even the famous Waterbury watch is there offered under the very eyes of Geneva. And there are other advantages arising from the separation of passengers into classes, not the least of which to the railroad company is the reduction of the prickings of the corporation conscience, when one more step

* The trucks were built to stand 1½ in. higher than as shown in the drawing.

is taken to crowd the lower class carriages, by the knowledge that there is an escape for those whose inconvenience can be measured by money into the better class carriages by the payment of the additional fare. American travelers are changing the accommodation for passengers by their loud complaints, and this is nowhere better seen than at the exposition. Many of the cars have end platforms and end as well as side doors, arranged in such a manner that it is possible, if one is willing to risk his neck, to pass from carriage to carriage by leaping over an open space of 18 in. One might think the arrangement of the passenger cars on the elevated roads of New York city was bad enough, with its 10 in. of opening between platforms, but in Europe, when platforms exist at all, they are separated by a chasm so great that even the guard, who can coolly crawl along the side steps of a train and collect tickets while traveling 40 miles an hour, dreads to cross it. And woe to the passenger who crosses this chasm in the absence of the guard, hoping thereby to reach the lavatories. These are often placed in the baggage cars, and before the passenger gets there and out again the guard is sure to be on hand, and the trespasser must remain amid the pet dogs and American trunks, and be compelled to read the achievements recorded upon the shanks of Alpenstocks for amusement until the next station is reached. Evidently the platforms are for use only at stations, and there they are unnecessary.

Again, the cars have porticos on the sides arranged for observation. These semi-covered passages serve also to permit passage to and from the different compartments of the car. In trains composed of this class of cars the conductor collects tickets after the American method. Cars of this construction are used on the Gothard, the Brünig and some other roads in Switzerland. Other cars are exhibited which will comfortably carry 75 passengers. In some cases these cars are so long that it has been deemed necessary to make them in two parts with a joint and a flexible attachment not unlike the American vestibule. Not a few of the cars have four-wheel trucks of a design so neat and strong that an enthusiast might easily claim them to be superior to the American bogie truck. Such trucks are wholly of iron, however, even the brake beams being made of round iron welded together to form a deep truss, which would undoubtedly have far less deflection for the pressure with which it is used than those now in use in the United States.

There is a train, not yet quite completed, composed of cars peculiarly American in design and arrangement. This train is exhibited by an Italian company. It is to be observed that the closet and toilet arrangements are being greatly improved, and that most of the best class of cars and not a few of the second class cars have a crude sort of saloon outfit, but the best to be seen lacks the completeness of those with which the American traveller is familiar. In addition to the exhibit of standard gauge cars there is a fine show of metre gauge equipment. This class of exhibits is remarkable for the minuteness of all parts and the general Lilliputian appearance. The wheels seem altogether out of proportion to the smallness of the gauge. They are small beyond all reason or necessity.

The Decauville railroad, which conveys visitors from one end of the grounds to the other, and extends out along the bank of the Seine, has been spoken of as a most complicated and intricate affair, the construction of which exhibits much skill upon the part of the builders. This is true, painfully true, but the road is nearly useless. The equipment is badly put together, and it goes rattling along over the line at infrequent intervals, and one waits at the station until weary of standing—for there are no seats—for the train to arrive, and again another longer and more aggravating period for the train to start. If the guard can observe even a possible passenger edging his way in the direction of the station, he awaits the settlement of the person's intentions before he blows a trumpet several times, waves his arms and shouts a verse or so of railroad French, and allows the throttle of the many jointed locomotive to be pulled. "Many jointed" may seem to be a queer term to be applied to a locomotive, but in this case it is a descriptive one at least. Within the space of a few feet in length there has been constructed a double locomotive, each part having two cylinders, each pair of which is worked on the compound system. The two parts of the locomotive are joined together and swivel as they pass around curves. The driving wheels are but 23¾ in. in diameter, and other parts in proportion. The whole machine is more like a toy than a real locomotive, constructed for what is, actually, most difficult service on a two-foot gauge line. It is thus that visitors are supposed to be transported about the grounds of the exhibition. "Supposed" to be carried, because many of the visitors, after being there several days, did not know of the existence of such a means of transport, and to find the stations is a more difficult matter than to walk to an entrance and hire a cab. For several days at a time traffic on the road has been stopped within the grounds.

A general description of some of the large passenger cars exhibited and their weights and capacity may be interesting to those who would like to make comparisons, but unfortunately only a meagre amount of information can be obtained regarding them, because the attendants are not themselves informed of the various dimensions and other particulars.

One carriage from the Eastern, of France, designed to carry 26 persons, weighs, without passengers, 30,580 lbs., which is about 1,180 lbs. dead weight per passenger when the car is fully loaded. This car has a side aisle or connecting doors along the inside of the car and also side doors as usual.

One carriage built by the Cie. Français de Matérial de Chemins de Fer, designed to carry 48 persons, weighs 54,000 lbs., about 1,130 lbs. dead weight per passenger when fully loaded. This car has side aisles, open to the weather, with iron railing. The aisles are on each side extending from opposite ends to the centre of the car. This car is cased with iron, has iron sills and two truss rods, and is mounted upon two four-wheeled iron trucks.

One carriage from Boneo á Guelma Railroad, designed by H. Desgrange, engineer, carries 49 persons and weighs 31,000 lbs., or 640 lbs. of dead weight per passenger. This car is mounted upon two four-wheeled trucks.

There is one sleeping car from the Eastern Railroad of France, designed to carry 20 passengers at night and 21 passengers during the day. The weight of this car is 23,000 lbs., or 1,150 lbs. of dead weight per passenger. The length of the car is about 25½ ft. and the width about 9 ft. It is mounted upon two axles.

One car from the Northern Railroad of France is designed to carry 102 persons, 3d class. This car weighs 59,950 lbs. and has an apartment for mail and bagggge. The dead weight per passenger and his luggage, with facilities for a suburban mail service, is 587 lbs. when the car is filled. This car is mounted upon 6 wheels, with one of the axles at the centre of the car. In order to pass curves a vestibule section is provided, which allows the car to articulate to suit the track. This vestibule is placed about one-third of the length of the car from one end.

One first-class passenger car is arranged for 42 persons and 6 beds, or a total of 48 persons. Weight 80,000 lbs., or about 1,670 lbs. per passenger. This car has 4 separate lavatories. The length is about 70 ft. over all.

Relations of Railroads to their Employes.

The Inter-state Commerce Commission has issued the following circulars, the first of which (A) was sent to General Managers, and the second (B) to Organizations of Employés:

(A) All facts regarding the relations existing between railway corporations and their employés are always of public interest, and may be of importance in determining questions upon which the interest of the employers as well as of the employed may depend. The Commission therefore address to you the following inquiries, believing that you will appreciate the purpose of the call, and that you will cheerfully render any assistance that may be within your power to facilitate the gathering of the information which they are designed to elicit:

1st. Is an insurance fund or guarantee fund of any sort provided for the employés of your company on which they have a right to draw in case of sickness or accident, or from which payment may be made to their families in case of death? If such fund exists, please state in what manner it was accumulated; how it is maintained; under whose direction it is administered; under what conditions money may be drawn from it, and any other facts respecting it which you may think it important to state. If there are any contracts or other writings or printed documents which will give definite information, and which are in your possession, the Commission would be pleased to receive copies thereof. Please also state the length of time the fund has been established; the reasons which have led to its establishment, and the feeling in respect to it on the part of the employés. If no fund of the sort named exists, please state if any attempt has ever been made to establish one, to what extent, if at all, the attempt succeeded, and why it failed.

2d. Has the company eating or lodging houses for trainmen when away from home, or does it provide reading rooms or other places of resort? If so, full particulars will be duly appreciated.

3d. Is any provision made by your company for technical education in your shops whereby it seeks to train men for its service? Is there any recognized system of promotion in the service of the company whereby it may be expected the men will be induced to labor for marked efficiency? Are any special rules in force to insure the competency of locomotive engineers and other trainmen?

Should your own information on any of these subjects be defective, please give the names and addresses of any persons connected with your company who may be able to supply any deficiencies.

(B) * * * 1st. Is there an insurance fund, guarantee fund, or any other fund from which the members of your order may receive payment in case of sickness, or accidental injury, or from which their families may draw in case of death? If such fund exists, please state when it was established, and whether by the railroad corporation or the employés; how it is accummulated; how maintained, and give any other facts that may be important to a full understanding of its history and workings. If no such fund exists, please state if its establishment was ever attempted; if so, to what extent, if at all, the attempt succeeded, and why it failed.

2d. Does your order insist upon any rules of apprenticeship, and if so, what are they? If a fireman or brakeman can only become engineer or conductor after a term of service, please state what that term is.

3d. In the case of engineers and conductors, are their grades of service recognized either by the order to which the employés belong or by the employing company? If so, what are those grades, and what are the conditions for passing from one to the other? In the case of men engaged in shop work, are promotions made from the ranks of the employés, or are men brought from the outside to fill the positions of foremen and the like? If no recognized custom exists, please state whether it has been the subject of discussion hitherto, and what have been the impediments, if any, to its establishment. Copies of papers or documents bearing upon these questions and calculated to elucidate the subjects will be thankfully received.

The Gautemala Central Railroad.

This narrow gauge line, extending from San José, on the Pacific Ocean, to the city of Guatemala, has, as some of our readers know, a new line in course of construction over fifteen miles of the most difficult part of its route. We have received an interesting sketch of the work on this line, taken from the semi-official daily, the *Bandera Nacional*, of July 5, and give the substance of it below:

"* * The costly change of location of the line between Escuintla and Palin springs from two causes, the first one of which originated in the agreement between the government and the railroad company of Aug. 27, 1887, by which the road agreed to substitute iron or steel structures or arch-culverts of masonry for the seven high wooden trestles existing on the present location, a change involving an estimated expenditure of some $300,000, and probably a temporary suspension of traffic. The second cause of change was a natural consequence of the first one, and found its solution in the sound common sense of the officers of the road, who, after carefully weighing all circumstances, did not hesitate in deciding upon a considerably larger expenditure, in order to obtain the best possible and safest line, under the given fixed topographical and climatological circumstances, and a line which at the same time would combine the most favorable and economical operating conditions in the premises.

"The road's proposition for a complete change of location was approved by the government, and work was commenced June 1, 1888. * * * The old line (still in operation) overcomes in 12½ miles the extraordinary rise of 2,600 ft. over 5 and nearly 6 per cent. gradients, passing seven high wooden trestles (70 to 150 ft. high and 150 to 400 ft. long), the preservation of which demanded not only the most scrupulous vigilance and continuous repairs, but also constituted a constant source of uneasy nervousness for the traveling public, while passing over the, in our climate and conditions, certainly dangerous structures, which under the best of care are liable to accidents.

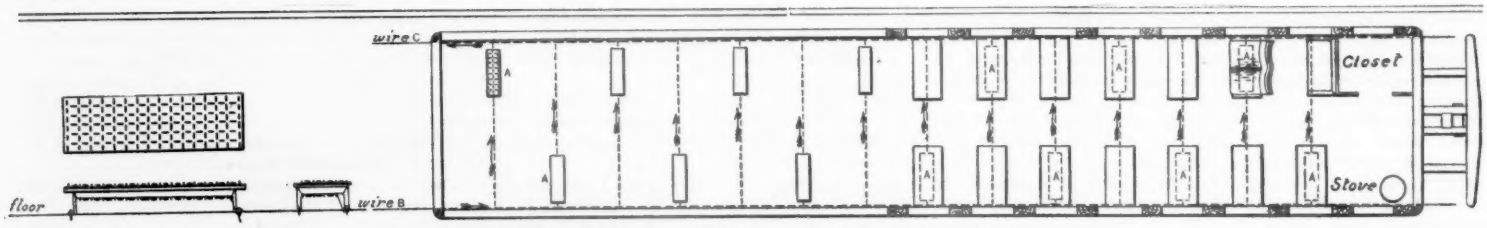
"On the new line, distance has been gained through a series of curves overcoming the elevation of 2,600 ft. on a location of little over 16 miles long, of which 15 miles constitute the present new construction, which crosses and recrosses the present line five times.

"The new line starts from the present line at Nanne's Junction, a little more than one mile north of Escuintla, on a 3 per cent. gradient. The track is 54 lbs. new steel. It is almost ready for traffic up to barranco No. 1, about 6 miles. On this section there are 14 openings, one covered by a 15-ft. span arch-culvert at Rivera, one open 25-ft. span on 34-ft. high abutments, five of 15-ft. span on abutments from 10 to 20 ft. high and seven box culverts, all of masonry, executed in the best manner in first-class ashlar work and arch-culvert masonry. The open bridges on this finished section are spanned by temporary wooden stringers, but the iron structures for the same have already arrived at Escuintla, and are ready to be put in place. At barranco [ravine] No. 1, solid stone abutments are being put in for an iron truss deck bridge of 150-ft. span. At barranco No. 2, called 'The Eminencia,' which on the old location is passed by a 400-ft. wooden trestle, a large 15-ft. span arch-culvert, 236 ft. long, will be finished this week, and over it a 50-ft. embankment will carry the roadbed. This arch-culvert is without doubt the largest bridge of its class in Central America. Barranco No 3 will be spanned on the new line by a 125-ft. iron truss deck bridge. Barranco No. 4 is passed over a 12-ft. span arch-culvert with a 40-ft. embankment, and is completed and ready for the track. Barranco No. 5 is to have a 110-ft span iron truss deck bridge. Barranco No. 6 will be passed on the new line over three different forks, each with an 8-ft. span arch-culvert, nearly all finished of splendid quarried granite. Barranco No. 7, or the barranco of Palin, will be passed by an iron viaduct 186 ft. long almost alongside of the present wooden structure of 200 ft. long. Between barranco No. 1 and Palin there are some 30 openings from 5 to 50 ft., partly open and partly box culverts, nearly all finished in good, solid masonry.

"The grading involves excavations and embankments on a scale never before seen in Central America, and these are nearly all completed. The total amount of earth moved is about 810,000 cu. yds., with some seven or eight thousand cu. yds. of masonry, of which latter about one-half is arch masonry. In the deep excavations a great deal of solid rock and large boulders were encountered. All bridge and culvert foundations are laid with first-class Portland cement. During the dry season, work was carried on with some 2,000 workmen from the departments of Alta Verapaz and Sta. Rosa, provided with the best plant and tools, including some 60 steel dump cars on portable railroad, and about 60 mule carts.

"The extraordinary heavy rainy season during the months of May and June on the Pacific Slope of Guatemala has done considerable damage to these new works, and at present the forces are mainly employed in looking after surface drainage, and in preserving the finished grade in good condition. The company has not only the whole material for the superstructure and track ready at Escuintla and at "Nanne's Junction," but has also imported and on hand sufficient 54-lb. steel rails for replacing the light 33-lb. steel of the Escuintla-San Jose Division. After this change is made, there will be about 30 miles of light superstructure ready for sale or for use on branch lines. In Val du Teil and St. Tomas, where there are valuable sugar plantations belonging respectively to Baron J. du Teil and Indalecio Amado, commodious and ample station buildings have been built.

"As stated above, distance had to be gained by lengthening out the line through a series of 8 curves; but on the very broken topography this could not be done without crossing and recrossing the present road five times. The orders prescribed not to suspend traffic on account of new construction, and, consequently, the above five crossings at either grade or above the present line had to be made without interfering with the reduced ruling grade. After a great deal of difficult work a final location, which in every regard filled the above conditions, was obtained by the able engineers intrusted with the solution of this problem, crossing the present track four times at grade and once overhead. If no unforseen contingencies should intervene, which certainly may happen any day in our tropical countries, the new line will be opened for traffic the present year, and make our communication with San José, on the Pacific—the principal sea



BURTON'S ELECTRIC HEATER FOR PASSENGER CARS.

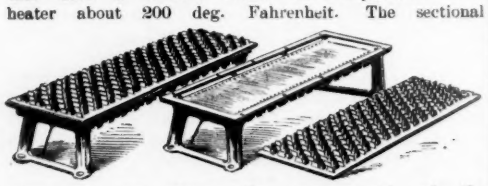
port of the country—as perfect as the nature of the ground, science and ample capital can make it."

We have received from Mr. Guillermo Nanne, the General Superintendent of the road, a collection of excellent photographs, showing the work on the new line at various stages, and embracing numerous interesting sketches of tropical life. There is also an interior view of the locomotive shops of the road. Mr. Nanne writes that American railroad men can, if they wish, see some skillful railroading on the six per cent. grades of his line. The difficulties encountered in operating such a road have been met with such care and forethought, that during the four years the road has been running, not a single one of the regular trains has ever been omitted. The engines are 43-ton consolidation and they work successfully with clean adhesion. Besides the Westinghouse automatic brake on every vehicle, maintained in perfect order, the water brake is used on engines. Mr. Nanne thinks these grades are preferable to easier ones with switchbacks, although some of his curves are 15°. The ruling speed in descending these grades is 12 miles an hour. This good record has been made and trains have been kept very closely to schedule time notwithstanding considerable adverse circumstances, among which are heavy tropical rain storms, which last for months. Those who would see the working of this steep line will, however, be obliged to visit Central America without delay, as it is hoped to put the whole of the new line in use within less than six months.

Mr. Nanne may be called the pioneer railroader of Central America, he having built the first railroad, the first telegraph, the first water conduit of iron, and the first iron highway bridge in the whole of that region. He has several sons who have been brought up in their father's profession.

Burton's System of Heating Cars by Electricity.

The accompanying gures illustrate Mr. W. Leigh Burton's proposed system of heating railroad cars by a peculiar system of resistance coils. Each coil is enclosed in a cast-iron case, forming the radiating surface, and provided with points for increasing the surface, as shown. The resistance wires are covered with dry, powdered clay, for the purpose of absorbing the heat from the wires, and thus preventing them from burning out. The electric current supplied to the heaters has a force of 80 volts, and each heater is expected to use about 2½ ampères of current, each heater having a resistance of 35 ohms, it being found by experiment that such a current raises the temperature of a heater about 200 deg. Fahrenheit. The sectional



view of car shows the arrangement of the heaters under alternate seats on either side—fourteen heaters in all, calling for an expenditure of 3½ electrical horse-power. In this figure, *B* and *C*, are the supply wires from the dynamo or storage battery, and the arrows show the direction of the current, the heaters being connected in "multiple arc." It is proposed to generate the current for these heaters by dynamos driven from the car axles, a surplus of current being produced and stored for use when the car is disconnected from a train, or employed to illuminate the cars with incandescent lamps. To heat a car standing in the yard, it is proposed to establish dynamos at the stations where cars are stored.

These heaters, once constructed, are expected to be permanent fixtures, requiring no further attention. The moderate rise of temperature produced precludes all danger of fire, and it is impossible for the resistance wires to be burned, unless the surrounding clay is raised to the burning temperature of the wire.

The management of the heaters is equally simple. If sufficient radiating surface is provided for the coldest weather (and it is proposed to put a heater under every car-seat, in exceptional cases), it will only be necessary to cut out one or more heaters from time to time, according to changes in the weather.

The data as to heating effect and current required have been obtained by experiments made on an electric railroad car (Sprague system) at Richmond, Va., and in an office of the Union Passenger Electric Railway Co. It is the intention to apply the system experimentally on cars of the Chesapeake & Ohio Railroad. The heater here described and illustrated is built by the Burton Electric Co., No. 834 East Main street, Richmond, Va.

English Train Accidents.

(*Concluded from page 523.*)

On the London & Northwestern, at Euston Station, London, Feb. 1, a train pulling out of the station was suddenly stopped by a signal, and was run into by an engine which was preparing to couple to the rear of the train as a pusher. It appears that the signal man, who is characterized as "first class," pulled a wrong lever, and threw up a signal in the face of this train, when, in fact, the track was clear. The runner, if he had been more alert, could have seen the signal sooner, and could have stopped soon enough to have prevented the collision. He says the steam obscured his view; but Major Marindin thinks he probably took it for granted the signal was pulled off, and did not keep the sharpest kind of lookout. It would have been better if he had sounded his whistle when he found he was to stop, so as to attract the attention of the engineer of the pusher. This practice of pushing has been followed at Euston for 15 years, and two runners have performed the duty during all that time; yet this is only the second mishap of the kind which has been recorded. Nevertheless, the risk is such that the inspector says that the engine should be attached to the front of the train and run to the first stopping place, which is never further than Willesden.

On the same road, March 7th, at Holyhead, a long train ran into the stop buffers at the end of the station platform, injuring several persons. Nine of the thirteen vehicles were fitted with the simple vacuum brake, which was arranged to work automatically in the brake-vans. The engine had a steam brake. The accident appears to have been caused by the failure of the brake, in consequence of the pipe between the tender and the first car becoming disconnected. There seems to be some conflict of evidence as to whether the apparatus in the brake-vans was in proper working order. The chief blame, however, is placed on the engineer, for approaching at a speed which could not be controlled by the hand-brakes. The company is replacing this brake with the automatic vacuum, which the company states meets the requirements of the Board of Trade, but Colonel Rich says the company should more strictly enforce its rule requiring trains to come into such stations at a rate of speed which can be controlled by the hand-brakes alone.

On the London, Chatham & Dover, March 18, an empty passenger train, standing at Snow Hill station, was run into at the rear by another passenger train The engineer of the approaching train did not stop, as he should have done, at the advanced starting signal at the preceding station. This starting signal and the distant signal for Snow Hill are on the same post, and, because of the steep descending grade (125 ft. per mile), the rules require trains to stop unless *both* arms on the post are lowered. The engineer and two other men on the train joined in asserting that the signals were down; but one man, who agreed with these at first, afterward confessed that they were actually at danger; and the condition of the interlocking, which was very complete, mechanically and electrically, satisfied General Hutchinson that the signal could not have been pulled off. The immediate trouble, however, was that the engineer was not cautious enough in controlling his speed on such a dangerous grade. The violence of the collision would have been greatly lessened had the train been fitted throughout with the continuous brake. The inspector is "glad to be informed that the directors of the company have at length decided to fit all their rolling stock with continuous brakes." The speed of the in-coming train in this collision was quite high, and one car was completely crushed; and to the distant observer it would seem that the brakemen of the train should be held responsible, to some extent at least, for not controlling the speed. There were, however, only two vehicles out of the twelve which had even hand-brakes. The engine had the Westinghouse driver brake.

On the Manchester, Sheffield & Lincolnshire, at Penistone Junction, March 30, at 3 a. m., the engine and seventeen cars of a passenger train were derailed and badly wrecked by a broken axle in the front truck of the locomotive. The adjoining main track was fouled, and a slowly moving train on that track ran into the wreck. One passenger was killed and over 60 were injured. General Hutchinson examined 21 witnesses at great length, including an Inspector of Locomotives, who had been in the service 40 years, and a civil and mechanical engineer, who had "had long and special experience in the fracture of metals." The conclusion is that the flaw which resulted in the breakage, which was at the wheel seat of the left wheel, had been of gradual growth. It extended through about half the area of the axle, and a large portion of the surface of the fracture had been abraded or bruised by broken ends of the axle remaining in contact after the breakage, but before the engine had ceased to run. The expert witness testified that the crack could not have been detected by ear by tapping the wheel or axle. He had made examinations of many axles to establish this fact. Neither could it have been detected by the eye, by any ordinary careful examination. He had known of similar fractures which it took an hour to discover, even where suspicion existed. This expert does not wholly reject the theory that this may have been a contraction crack, produced by heating and sudden cooling General Hutchinson finds that the axle had run 619,414 miles, and therefore the wheels should have been taken off when the engine was in the shops, two months previous. From marks on the rails he thinks the axle broke six miles before the train was derailed, and just after the engine had hauled a heavy train up a steep grade, but he does not show what connection a heavy train has with the breakage of an axle in the leading truck of an engine. Moreover, the engineer, and fireman had not detected anything wrong, but General Hutchinson refers to the case reported last year where an engine's drivers went off the track and on again, without the knowledge of the runner, and says he is not surprised. In this case, it was alleged that the engineer and firemen were not sober, but the Inspector finds no ground for the suspicion. The engineer had gone outside to purchase some tobacco, "thereby committing a serious breach of discipline," and he had backed against the train too quickly when doing a little switching some distance back. Aside from this, no fault appears. The signalman is commended for having thrown up the signals on the opposite track as soon as he saw the derailment. Finally, the Inspector says there should be a conference of locomotive superintendents to consider the important question of how many miles axles should be allowed to run before being submitted to an exhaustive examination. There are sixteen axles on this road whose mileage is nearly as great as the broken one. These should be examined at once.

On the Metropolitan Railway, at Moorgate street, London, Jan. 16, a Midland passenger train came into the station so rapidly that it broke the buffer stop and the bookstall behind it, injuring the bookstall keeper and nine others. The train had the automatic vacuum brake, and it was in good order. The engineer acknowledged that the fault was his, but there was a conflict of evidence as to just what caused the trouble. Major Marindin thinks, on the whole, that the small ejector used for keeping up a constant vacuum was inadvertently shut off by the engineer while running. He adds:

"It is, at any rate, quite apparent that the hand-brakes alone were not sufficient to stop the train, and I believe that it would prevent many of these buffer-stop accidents if the rule for entering terminal stations were that the continuous brake was never to be used except upon an emergency, which would have to be explained; and not, as at present upon most lines, that the speed is to be such that the train *could* be stopped by the use of the hand-brakes only. Estimates of speed are notoriously unreliable, and no one who has watched trains entering terminal stations can be unaware of the fact that, possibly because of drivers' miscalculation of the speed, trains fitted with continuous brakes do very frequently run in faster than those without this appliance, and at such a speed that they could not be stopped by the use of hand-brakes only."

On the Midland, Jan. 3, at Leuton south junction, near Nottingham, a passenger train ran into the rear of a coal train about 7 p. m., in a dense fog. The signalman was clearly to blame, having admitted the passenger train before he had received notice that the freight had passed out of the section. His only explanation is that between the time that the coal train passed and the acceptance of the passenger train he was attending to the switching of a freight on another track. Major Marindin attributes the accident "in great measure to the state of the weather," and is glad that the alertness of other employés offset the negligence of the signalman and made the collision comparatively slight. Nothing is said about the value of electric locking.

On the Northeastern, March 2, at 11 p. m., at Staddlethorpe Junction, the engineer of a Lancashire & Yorkshire freight train ran past a signal and into the side of another freight train which was pulling out of a siding. The force of the collision threw one of the engines on to the adjoining main track and wrecked the four rear cars of a passenger train which was passing at 50 miles an hour. These cars, were, however, empty, and no one was seriously hurt. The primary cause of this collision was the comparative ignorance of the engineer (who had received a printed notice on Jan. 22) of certain changes in the location of the semaphores. He had not been over this line since the alteration, and had never been on this part of the road more than three times. The fireman was sent with this runner on this trip especially because he had a knowledge of the line, but he neither warned the engineer that he was running too fast, nor applied the tender brake. General Hutchinson does not seriously blame the engineer. He overlooked the printed notice issued in January, but that notice did not emphasize the fact that the new signal was placed on the wrong side of the track, as it ought to have done. He should have inquired of the fireman instead of assuming that the new signal was a distant signal and not one to be stopped at. The rear portion of the train which he struck was on a track parallel to him, and showed a white tail light, whereas it should have shown three red ones. The white light was on the side of the car next the main track, and the usual indication of a light in that position is that the train is either on a siding (clear) or is running on an independent parallel line. The fireman, although supposed to have a knowledge of the line, had not been upon it for ten months, and he had not received notice of the alterations. He appears not to have kept a very sharp lookout, although, of course, he was not to blame for not knowing of the alterations. He had been approved for promotion to engineer four years ago. The inspector blames the freight conductor for not having the tail lamps in proper position, and the locomo-

tive foreman for selecting a man with so little recent knowledge of the road to act as pilot. The company made a mistake in locating a new signal on the wrong side of the track, and this mistake is to be corrected. The Lancashire & Yorkshire pursues a mistaken policy in not issuing notices to their firemen as well as runners of alterations of signals, either on their own line or on others over which their engines run. The inspector concludes: "If the Northeastern Co. find it impossible to work the block system with their goods and mineral trains without giving line clear to the cabin in rear directly the tail of a train has passed the home-signal, whereby the block interval may be reduced to the thickness of a single post, they should, I think, at any rate instruct their signalmen to use the block signal, 'section clear but station blocked,' under such circumstances." The fast passenger train which was involved in this collision was stopped, by the rupture of the air-pipe, in 630 ft.

On the North Staffordshire, at Harecastle, Feb. 28, an express train running at 50 miles an hour was derailed at a frog by a loose connecting rod, the crank pin having broken. The train had the simple vacuum brake, which became inoperative by the parting of the train and the cars were badly scattered, but none were upset and only a few passengers were injured. The drivers of the engine were 6 ft. in diameter and their centres 8 ft. 2 in. apart. The total weight of the train was 202¾ tons, and of this only 125½ tons was on braked wheels. Major Marindin says:

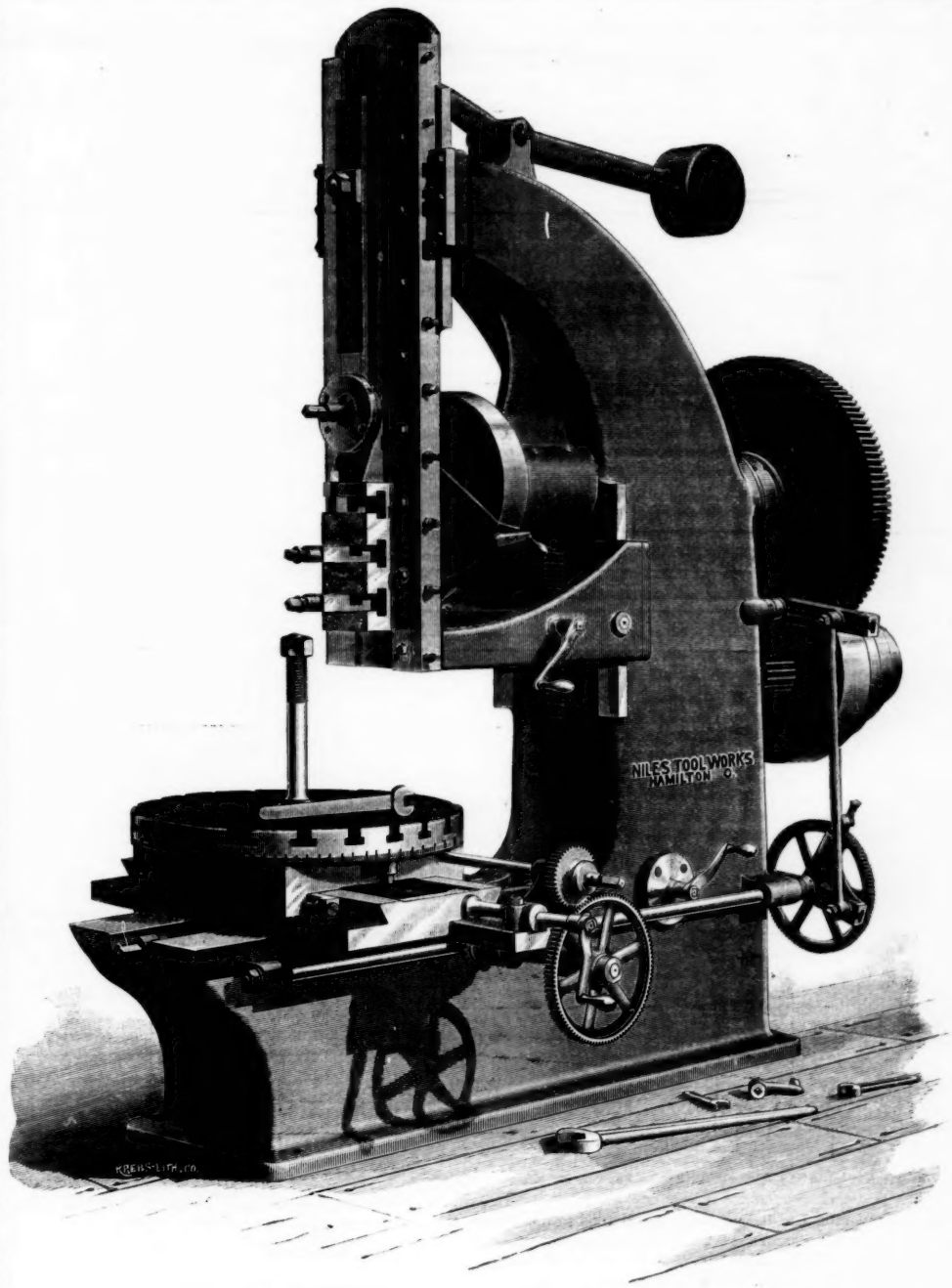
"The crank pin which failed was made of the best Low-moor iron, and was fixed on a wheel crank in the usual manner, the crank being shrunk into it, and the head of the pin being rivetted at the inner end. It measures 3¾ in. in diameter, and it was broken somewhat diagonally across, from 1¼ in. to 2 1/16 in. inside the boss of the crank. The fracture shows a very bad, old flaw extending so far into the metal that it left sound only a strip of ¾ in. in width along the diameter of the pin. The forging of the pin was probably a bad one and the flaw of long standing, but that the metal was of excellent quality is proved by the fact that with only 3.172 sq. in. of metal holding, out of a total area of 10 32 in., the pin should have lasted for as long as it did without breaking. Secured as it is, the crank pin becomes practically a part of the wheel, and it would be quite impossible to detect a flaw inside the boss by any known method of examination, however careful. It has been suggested that such flaws in inaccessible positions might be detected by some electrical contrivance, and such an invention would be a most valuable one. I am not, however, aware of any reliable apparatus of the sort having been as yet perfected."

On the Southeastern, March 19, at Red Hill Junction, a London, Brighton & South Coast express had a Pullman car on which one box was running hot; an inspector was riding on the steps to watch this box, and as he leaned off his head came in contact with the support of a station platform roof, and he was killed. It appears that there was a gate at the platform of the car which the man had to lean over, but the post was only 20 in. from the side of the ordinary cars and about 17 in. from the Pullman car. The gate on the car platform was, however, 6 in. inside the side of the car. General Hutchinson says "it is most desirable that no unnecessary time should be lost" in altering the station building, and he hears that the directors have already taken action. The post was erected in 1857.

On the Wrexham Mold & Connahs Quay Road, Feb. 23, at Wrexham Exchange station, a passenger train running at 25 miles an hour was derailed on a curve. Colonel Rich says the accident appears to have been caused by the unsteady running of a horse box which was next to the engine, and was not tightly coupled to it. The other vehicles were heavy and were under the control of a powerful chain brake. The horse box should have been placed behind instead of in front of the passenger coaches.

Improved Slotting Machine.

The cut herewith illustrates a slotting machine with 14-in. stroke, made by the Niles Tool Works, Hamilton, Ohio. This machine is built in four sizes, 10 in., 14 in., 18 in. and 30 in., and the company also makes heavy geared slotters of 24 and 54 in. stroke for forge work. The machine is provided with the Whitworth motion, giving a slow motion under the cut and a quick-return movement. The cutter-bar is counter-weighted, which entirely prevents any jar in running. The table has compound movement: it is provided with a circular plate, which is fed automatically by tangent gearing. The feeds invariably take place at the upper end of the stroke; never during the cut. The actual stroke of the machine is enough greater than the rated stroke to allow for the operation of the feed, so that the full rated stroke of the machine is always available for work. The handles for operating the feeds are all placed close together, so that the operator can handle any of them from the same position. He can, also, at the same time watch the cutting tool. The cutter-bar bearing may be raised or lowered to suit the work being operated upon. The cutter-bar is always supported close to the work, which makes it very stiff, and free from any tendency to spring.



IMPROVED FOURTEEN-INCH SLOTTING MACHINE.

Made by the NILES TOOL WORKS, *Hamilton, Ohio.*

The Parsons Block, Switch and Frog System.

Mr. Henry F. Parsons, a mechanical engineer, has invented and patented an automatic "block, switch and frog system," the details of which he has worked out with much ingenuity. The following description explains the working principles:

The block system is intended to be operated entirely and automatically by the trains, and so to obviate the expense of signal towers and their attendants, as required by the ordinary system now in use, and to confer the advantage that in case an engineman should run by a danger signal, a bell is rung in the cab, and steam shut off and brakes applied automatically.

This is accomplished by having at regular intervals of one mile a signal-post and signal set a convenient distance from the side of the track. A series of levers are placed along the track, two at each signal, one about 10 ft. in advance of it and the other the same space beyond it. These levers are from 4 to 6 ft. long, about 4 in. wide, made of iron, inclosed in an iron case, and are fastened to the ties about 6 in. outside of the rails on the same side of the track as the signals, having the top of the lever about 4 in. above the top of the rails. From fig. 1 it will be seen that the lever is T shaped, pivoted at one end, so as to rotate vertically through a small angle. At the other end an arm, projecting downward, is connected with a toothed section, which in turn is geared to a pinion set on a horizontal shaft. The vertical motion of the lever is thus converted into the rotary motion of the pinion and shaft. At the end of the shaft is an arm supporting a 5/16 in. wire rope, which latter, when the shaft gives a partial revolution, is made to operate the signal at a mile's distance. The cross sectional view shows the lever and gearing set in an iron box, while the vertical flanges of the top of the lever effectually prevent the entrance of rain, snow and ice, or of pebbles or other obstructions to interfere with the lever's action. The mechanism in the signal-post is similar. The wire cable acts reversely through another arm, shaft, pinion, which pinion is geared with a rack, and so operates the signal.

In the cab of the locomotive are two treadles worked by the foot of the engineman, which control a vertical rod beneath the cab. This rod is heavy and has a roller at its end (to reduce friction in passing over the levers), which is carried horizontally about 6 inches above the rail, and can be given a lateral movement at the option of the engineman by the action of the treadles in the cab. The vertical movement depends entirely upon the action of the levers. It can be depressed and moved sideways so as to strike the levers, and can be locked in that position so as to strike all levers as passed. The rod, however, is held by spiral springs of sufficient tension to depress the levers, but should one locked be encountered, the rod will be driven up and ring a bell in the cab or blow the whistle so as to warn the engineman, or else it can be arranged so as to shut off steam, apply the brakes and bring the train to a stop.

The modus operandi of the block system can now be understood. A train on starting passes the first lever, but immediately on doing so the engineer depresses the bar, which strikes the second lever set on the othe other side of the signal post, which being forced downward is made to operate as previously described, throwing up a small block under the first lever, thus locking it rigidly, and by means of the wire-rope setting a danger signal to the rear, and a white signal one mile in advance of the train. On reaching the next signal post this operation is repeated, and when the train gets half way been posts 2 and 3, a single lever is passed, which on being depressed drops the danger signal at post 1 and removes the lock from the first lever. Block No. 1 is therefore free. Should a train attempt to run by a danger signal the locked lever will force up the engine bar and either ring the warning bell or actually stop the train as described. This warning device is, therefore, the sole purpose of the first of each pair of levers, and it is the second lever that actuates the signals.

The unlocking and dropping of the danger signal of the previous block should be done, especially with freight trains, by the last car or caboose, which is provided with a bar similar to the ore on the engine, but arranged to pass by the ordinary levers and strike the unlocking ones only. Then, in case a train should break in two, although the engine and front portion might run ahead setting successive danger signals, the rear portion would still be protected, because the last car would do the unlocking.

The purpose of setting white signals in advance of the train is two-fold; first, to indicate to the engineman that the system is working, and secondly, on single-track roads, to act as a block ahead to prevent butting collisions. By the same system white or other colored signals can be thrown up at every road crossing ahead of an approaching train, and at the same time a gong be set ringing.

In addition to providing a complete automatic block sys-

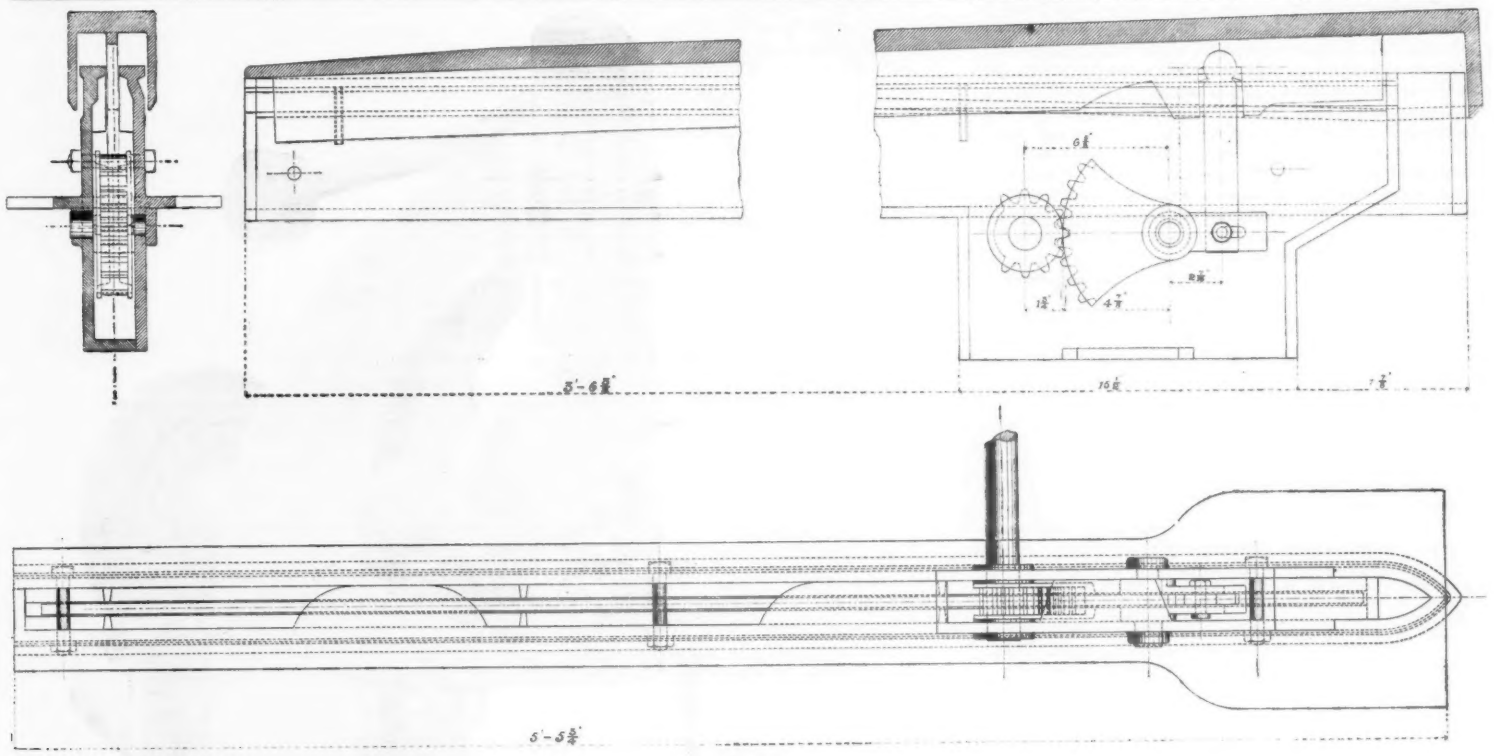


Fig. 1.

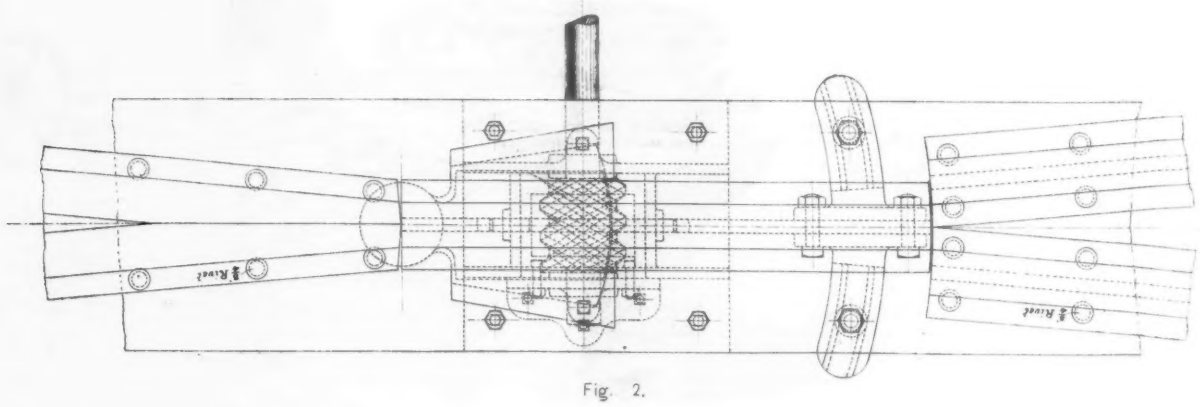


Fig. 2.

tem, the inventor has designed a simple method for opening and closing switches from a moving train, and has constructed a continuous rail frog, which latter, as it also illustrates the mechanism of the former, will be described first. Fig. 2 is a plan view and fig. 3 shows the mechanism of the frog in transverse and longitudinal sections. Instead of meeting in a sharp point, the point rails are cut off, and butting against them is a single rail, 26 in. long and pivoted near the rear end. Beneath the plate is a cross shaft carrying a worm, gearing with which on top is a "rack." This rack, through an opening in the frog plate, is riveted to the movable rail, so that as the worm revolves to right or left the rail swings about its pivoted end and forms a continuous rail. The shaft is connected with the switch stand, so that throwing the switch sets the frog as well. The switch stand has a precisely similar mechanism, viz. rack and worm, which has the advantage of providing a firm lock in itself, as the switch lever cannot be thrown over by any side movement of the switch. Any form of switch can be used, either split or stub, and the switch can be thrown by hand, the same as with an ordinary stand. In the Parsons system the switch stand is connected with levers, so that the engineman of an approaching train, wishing to take the side track, depresses the lever in the same way as he sets block signals. Then, after the train is pulled on to the siding, the unlocking device on the caboose strikes a lever, which closes the switch and a moment later drops the previous block signal, thus leaving the main line all clear. A freight train taking a siding in this manner is not obliged to stop and start again, thus saving time and avoiding the expense and annoyance of a start, a great advantage if the switch be located on an up-grade. The switch-operating levers are in pairs, so that an engineman, if approaching a switch, can assure himself whether a switch is set rightly by adjusting his engine bar so as to strike the levers. If a switch be misplaced, the first lever will be locked and will give the regular warning. The levers for setting switches for the siding are placed 5 in. further from the rail than the signal levers, so that the engine attachment must be purposely moved laterally by the engineman in order to operate them.

Grade crossings can be protected in a similar manner by oncoming trains setting danger signals on the other track, and at the same time operating a switch so that a train which ran by the signal would be side-tracked.

The several mechanical movements are simple and positive, consisting principally of worm and pinion gearing. All strains are direct, and those portions of the appliances which act through long distances are in tension. Proper devices are used to allow for expansion and contraction where necessary.

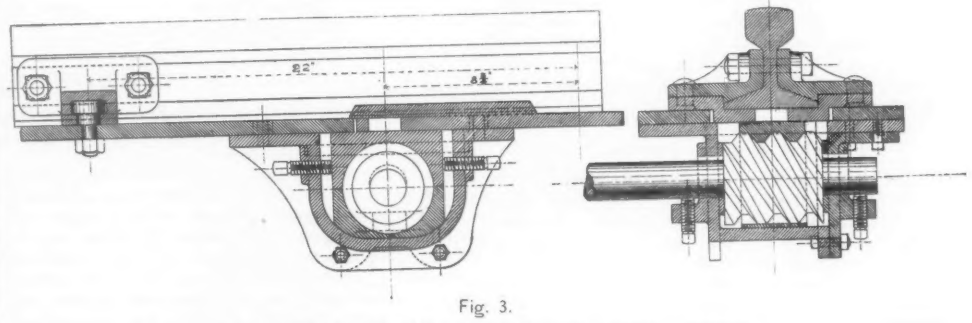


Fig. 3.

THE PARSONS BLOCK, SWITCH AND SIGNAL SYSTEM.

The system is in actual test upon three miles of a much-used spur of the Chicago, Rock Island & Pacific Railroad, at the crossing of the Elgin, Joliet & Eastern, at Joliet, Ill. Through the courtesy of the latter company an engine has been equipped with the necessary device to operate the system. The apparatus when seen there by a representative of the *Railroad Gazette* worked satisfactory. A carefully-constructed model on a large scale can be inspected at the inventor's office, No. 29 Broadway, New York, where further information can be obtained.

Locomotives at the Paris Exhibition.

The Northern Railroads of France has one of the best exhibits of locomotives; all of the parts of the engines are well made and finished. One machine in particular deserves especial mention. It is one arranged for double expansion, with three cylinders and side rods, the cranks being placed at 120 degrees. The following are some of the general dimensions: Driving wheels, 6 in number, 65 in. in diameter; weight on drivers, 89,000 lbs. Diameter of the one high pressure cylinder, 18 in.; two low-pressure cylinders, 19.7 in.; stroke of pistons, 27.6 in.; boiler pressure, 210 lbs. per sq. in. During average working the initial pressure in the low-pressure cylinder ranges above and below 92 lbs. per sq. in. Arrangements are made for the admission of high pressure steam into the low-pressure cylinders. This locomotive has been in actual service one year. This company also exhibits a single expansion engine remarkable for its beauty and for its plain finish. The parallel rod is, although expensive, almost exactly the shape demanded by good mathematics, and furnishes the lightest rod for any required strength. This locomotive is the standard eight-wheel passenger locomotive of the Northern. Among the others which this company exhibits one notices the famous "Woolf type" of compound, with the cylinders arranged "en tandem." This locomotive was fully described in the *Railroad Gazette* March 8 last, and it is the one with which the experiments therein noted noted were made. It is an object of interest to all railroad engineers, and it is to be regretted that a better opportunity could not be had to examine it. Several large drawings of the most interesting details are arranged near the machine.

The locomotive which was built recently in France with six driving wheels about 8 ft. in diameter, and the tender and car built to accompany it, are among the locomotive and car exhibits. The cars have wheels 10 ft. in diameter, one on each side at each end. The cars are made with two decks and four compartments, one above the axles (for second class) and three below; one of these is between the axles, and one is at each end. The framing is of box-girder construction, riveted together as in bridge work. Nothing in the railroad line causes so much amusement as these monstrosities. The locomotive has seen hard service, as shown by the rust and marks on the parts. The service may not have been long

but it must have been intense, because the equipment was intended for use at 100 miles per hour, the additional velocity being supposed to be possible by reason of the reduction of the journal and, possibly, other friction.

Among the other locomotives, and not far from the very interesting exhibit of the Pennsylvania Railroad, can be seen an American type of express locomotive built by the Southern Railroads of Italy. This locomotive is so like the American engine that it is easily mistaken for one. It has a four-wheeled truck in front and four driving wheels. The boiler is large, is raised high in the frames, and has large heating surfaces and water capacity. The steep grades on some portions of the line where this engine is used render it necessary to have heavy engines, and the weight is largely obtained by the use of a large boiler well filled with water. The detail description of this as well as many other locomotives has not been prepared by the exhibitors, therefore a full description is impossible. In general it may be said that the engine truck is a new and rather satisfactory design, and the parallel rods are exceptionally symmetrical, while the whole finish of the machine is all that could be desired for simplicity and beauty. The engineers of the railroad are pleased to say that they designed the engine somewhat after American pattern.

The locomotives which are built at the Winterthur shops at Winterthur, Switzerland, are praiseworthy in a high degree, particularly in regard to their workmanship. The same may be said of the stationary engines and other machinery from the same place. The traveler on the lake and river boats in the vicinity of Switzerland is ever pleased by the appearance of the machinery, which is almost invariably built by the same firms. All of the castings have a smooth finish and are made of the most modern shapes. The old-fashioned square corner and disagreeable angularity has disappeared, and in its place are curves that correspond to the mathematical lines of strength, while at the same time coinciding with the lines of beauty. A peculiarity of minor construction at the Winterthur shops is the fashion of cutting oil grooves down the sides of the cone which forms the lathe centre in the ends of driving axles, in order that the lathe centres may be oiled while the axles are being turned without removing them from the centres.

The large compound mogul locomotive built by the Société Suisse, at Winterthur, is remarkable for its light connecting and side rods. The fire-door connections are of peculiar design and worthy of special mention at a future time. A grease pad is attached to the locomotive in front of each of the two truck wheels to lubricate the flanges of the wheels as they pass a curve. The swinging of the truck brings the brushes in contact. The valve rod has a long, flat place in it to allow the end to spring freely in a vertical direction to compensate for the movement of the rocker arm in the arc of a circle. The pressure which this locomotive is intended to work under is 180 lbs. per sq. in., the amount, as usual in Germany and Switzerland, being stamped upon a plate fastened to the boiler butt.

A peculiarity of another locomotive, built by the Société Suisse, at Winterthur, is a parallel rod used on the rack rail locomotives for the Brünig Pass Railroad, which has been in operation but a short time. This parallel rod has three bearings in its length, one at each end on the driving wheels as usual, and another about $\frac{1}{10}$ of the length from one end. This connects with the crank shaft driven by the cylinders of the locomotive. At this point the rod swells in size, and surrounds a brass box which slides about 1 in. vertically in the rod, thus making allowance for variations in the level of the track.

A ride upon one of their engines in actual service upon the mountain railroad showed that they were admirably adapted for the work for which they were designed. The grades are very steep, and, with a load that filled four large cars completely, there was no lack of steam or power. In the cab of the locomotive is located a speed recorder, which is driven from a return crank on the rear axle of the locomotive. The train and engine are equipped with a steam brake, which holds fast a cog wheel under each car, the cog wheel being fitted to the rack placed between the rails. The driving springs are made unusually stiff, probably in order to reduce as much as possible the vertical movement of the driving boxes in the frames, on account of the three connections in the body of the parallel rod, otherwise the great motion of the ends of the parallel rod would cause the brass boxes at the centre to exceed the motion provided for and possibly result in bending the rod. The safety connection between this locomotive and the cars is peculiar. It consists of a wire rope $1\frac{1}{4}$ in. in diameter, and about 4 ft. long, on each end of which is attached an eye of wrought iron. These eyes are slipped over hooks on the engine and on each car, so that in case the regular connection fails the rope will act as a safety appliance. The regular connection consists of a draw-bar not unlike, and about the size of, those used between light locomotives and tenders in the United States. The drawheads closely resemble those used on freight cars in America, differing principally in having a larger face; in fact, the face is about double the dimension of that of the average freight car drawhead. No provision is made for taking up the slack between the cars, and they strike together not unlike the cars in a freight train. Hose is not used to convey the steam for the steam brake, but instead there is a series of universal joints held together by springs and attached to which at the lowest point is a steam trap not unlike the Hawes trap. The boiler butt in the cab of this engine, as well as that of most German and Swiss locomotives, is covered with a non-conductor of heat and a heavy jacket iron. The steam pipes within the cab are closely wound with a hemp or jute rope, in order to keep the engineer from burning himself, and to reduce the temperature of the cab in warm weather. The cabs are large and are made of iron except the roof, which is of wood secured to carlines made of a light channel, about $1\frac{1}{2} \times \frac{5}{8}$ in., bent to suit the shape of the roof. The section of the parallel rod body is quite new; it is of a channel form, with the recess toward the outside of the engine. In appearance, it therefore resembles the ordinary I section.

The Société Alsacienne de Construction Mécaniques exhibits a locomotive with four cylinders, operated on the compound system, with two high and two low-pressure cylinders. The four drivers are not connected by parallel rods, but as in the Webb compound, are rotated independently. It differs from the Webb engine, however, in having no dead centre upon which the crank is liable to become powerless. The cranks of each pair of cylinders are placed at right angles to each other.

The Paris, Lyons & Mediterranean exhibits a locomotive of the compound type with three cylinders not unlike the Webb compound in this respect, but having a parallel rod between the drivers.

The Société Alsacienne de Construction Mécaniques, Usine De Belfort, exhibits a locomotive having two independent steam and two independent exhaust valves for each cylinder. The gear is what is known as the Bonneford valve gear. It is operated by gears and cams.

The English and Belgian railroads have locomotive exhibits that are worthy of special mention.* D. L. B.

THE SCRAP HEAP.

Notes.

The new round-house of the Wisconsin Central at Ashland, Wis., was partially destroyed on Thursday night, Aug. 8, by a fire which started in the oil room. Four engines were destroyed. The loss is about $40,000.

Conductor Reach, of the Wabash, who struck a train robber in the face with his lantern a few nights ago near Kansas City, has received a gift of a silver lantern from the passengers and from the railroad company $50, with a complimenletter.

The passenger agents of the Pennsylvania lines west of Pittsburgh, some 60 in number, have just been on their annual excursion as guests of General Passenger Agent E. A. Ford. They went to Mackinaw and other resorts in Michigan.

General Manager Kimball, of the Union Pacific, has issued an order abolishing the accounting department in the office of all division superintendents. Heretofore the expenditures and receipts, together with the amount of business handled on each division, were reported by division departments. The new order makes this a duty of the auditing department.

Favoring the Railroads in Iowa.

A newspaper item states that a farmer in Buena Vista County, Iowa, shipped 300 steers to Chicago and held them there two days, but could not get what he considered a fair price; he then shipped them back home and began buying more cattle. When he had 700 he shipped them to New York and chartered a steamer for $3,200 and took them to England, realizing a handsome profit on the venture.

Corporation Fees in Ohio.

Suit has been brought in a Common Pleas court to restrain Secretary of State Ryan from paying into the State Treasury the $52,000 fee recently paid by the Wabash Railroad Co. for the certificate incorporating the consolidated company. The object is to test the constitutionality of the Massie law, passed at the last session of the General Assembly, increasing the fees for incorporation to one-tenth of 1 per cent. of the capital stock.

An Invisible Train Wrecker—Worse than a Ghost.

The Toledo, Columbus & Cincinnati is probably the only road that can be blockaded by air, says an exchange. One day last week the gas escaping from the two new wells struck at Swartsville, O., was so heavy over the tracks of the railroad that in order to pass the place without igniting it the fires in the locomotives had to be carefully banked. Trains under full headway and with steam shut off then ran safely through the streak of gas.

Tramps

A sample outrage is reported from Reading, Pa., as follows:

"Late on Monday night 15 tramps jumped on a Philadelphia & Reading coal train below this city, near a point where two of the railroad company's officers were dangerously shot. The tramps cut the train in three parts, which act was discovered just in time to prevent another train from running into the first train. The railroad police officers and a squad of city police were called out, but when they arrived on the scene the tramps had fled. It was then discovered that they had robbed the caboose, the brakeman being seized and rendered powerless. Similar outrages have recently been frequent."

Iowa Railroads.

Governor Larrabee, of Iowa, has asked the railroad commissioners to obtain and incorporate in their annual report information from every railroad doing business in the State on the following points: The names of all stockholders, their place of residence and amount of stock owned by each; the salary paid to general officers; the average daily wages paid to employés; the names of regular attorneys in Iowa, the salary and other compensation of each; also the names of all other attorneys in the state retained by the road during the year and the retaining fee per diem, or other compensation or emolument received by each; the number and total mileage of so-called 1,000 and 2,000 mile tickets issued for other than cash compensation; also, whether the cash value of all mileage tickets is included in the report of gross receipts.

A Narrow Escape.

The train accident record for August will have missed one item by a very narrow margin.

On the afternoon of Saturday, Aug. 3, an east-bound passenger train of the East Tennessee, Virginia & Georgia, running over the Western North Carolina Division of the Richmond & Danville, about two miles east of Paint Rock, N. C., crossed a trestle about 100 ft. long, which settled about 3 ft. while the train was upon it. The speed of the train was sufficient to carry it over all right, but the couplings were considerably strained and some of the steps damaged. The track inspector had crossed the trestle only three minutes before the train, and the water in the creek below was then at its normal height, but a sawmill dam, some little distance up stream had burst, and when the train reached the creek the water was 8 or 10 ft. deeper than usual, and some of the wreckage of the mill had lodged against the trestle. The track on the trestle had recently been laid with new 65-lb. steel rails and the splice bars, spikes and ties were all in the best condition. As soon as the train had passed off the bridge the track sprang back to nearly its normal level, and one bent of the trestle tumbled over into the water. The train was fortunately a light one, with one of the new standard passenger engines, or, in case an accident of this kind had happened a short time before, when the rail joints were laid in chairs, the outcome would have been far different.

Thrall's Mileage Ticket.

Some of the customers of the New York & New England have been making complaints, more or less mild, against the Thrall Mileage Ticket, which has lately been put in use on that road. The distinctive feature of the ticket is that the coupons are in one continuous strip, about 9 ft. long, and it appears that the point which offends the users of the ticket is that this long strip sometimes gets loose and causes annoyance; but the reply is made that the ticket should and can be used while strictly complying with the rule to keep the folded strip confined within the rubber band which is supplied for that purpose.

This would seem to be a reasonable claim, and it certainly is a decided advantage to have a ticket from which conductors must always detach their coupons from the right end, instead of mixing the numbers, as is common with some forms; and it is a marked advantage to the conductor to be able to have the coupons collected from each passenger always in one piece. The strip is $2\frac{1}{2}$ in. wide, and each mile is represented by a horizontal line. These lines are less than $\frac{1}{8}$ in. apart, and the conductor must tear the strip transversely between two lines. There is a brass straight edge fastened to the cover to enable him to do this conveniently. The printing on the coupons is in duplicate, and there is a perforated line lengthwise of the strip, about $\frac{1}{2}$ in from the right-hand side, which may be easily torn, separating the ticket into two parts, and the smaller part is to be detached by the baggageman when checking baggage on a ticket. This ticket is now in use on over 90 different roads. The inventor, as is well known, is Mr. W. A. Thrall, General Ticket Agent of the Chicago & Northwestern.

The Age of Steel.

Ex-Mayor Abram S. Hewitt of New York City, returned from Europe last Saturday, and conveyed to a reporter of the New York *Sun* some interesting statements of his observations at the Paris Exhibition, and deductions therefrom, as follows:

"The one new thing that is likely to attract attention from engineers is a process for making frames for locomotives and cars of all sorts from sheet steel. The frame is formed out of a sheet of steel by hydraulic pressure. This would have been impossible twenty years ago, because the iron plates of that time would not have stood the strain of such an operation. That was to me the most striking thing in the Exposition. People have been wondering where the next opening for the use of steel was to be found. There is no doubt that it is in the manufacture of car frames. The ordinary frame will rot out, say in ten years. I should think that a steel frame might still be in excellent condition after being used 100 years.

"Another important feature of the Exposition is that which shows how much the cost of steel has been cheapened. The reductions in prices of steel in this country have been made through the adoption of foreign processes, but steel is to be cheapened very much more. I saw steel made repeatedly from low-grade pig at a cost of $4 a ton. On account of the difference in the cost of labor we cannot do that here, but we can take the pig-iron of the Southern, costing say $8 a ton, and convert it into steel at a cost of $7 more. This process will be introduced here at once. I look for an unprecedented extension in the consumption of steel in this country. It will be produced at a price so low that it will be used in an almost infinite number of places not now thought of. The process of producing aluminum has reached a point where the metal costs only a dollar a pound. Should it reach the cost of steel, of which there is now a possibility, it will create a revolution in the arts. The world never gave such promise of producing wealth at so low a cost as it does now."

Premiums for Economical Use of Fuel.

The Buffalo, Rochester & Pittsburgh now has in force a a regulation by which half of the saving in fuel consumed by the locomotive is divided between the engineer and fireman. The plan is similar to that heretofore in use on some of the Pennsylvania lines and elsewhere. A stated amount of coal is allowed for each freight run and class of work; an account is kept of the amount consumed above or below the allotted quantity, and at the end of each month half the value of the coal saved is paid to the men. On the Rochester division in June, twelve engineers made an average of $2 50 and the firemen $1 80, but some of the men made as much as $6. The engines are not only fired better under the new plan than formerly, but there is less smoke. The average consumption of coal per trip on the Rochester division is 8,000 lbs., on the Buffalo division 7,000 lbs., and on the Pittsburgh division 11,000 lbs.

Railroad Taxation in Arkansas.

The Arkansas Railroad Commissioners have just reported their assessment of the roads of that state. The assessments of several roads were increased at rates varying from $200 to $2,000 per mile. The Memphis & Little Rock was reduced $500 per mile, the road now suffering considerably from the competition of the St. Louis Iron Mountain & Southern. The total valuation of the roads of the state is $18,203,503. The lowest valuation per mile is $2,000, which applies to the Mississippi River & Northwestern and two other roads. The highest rate per mile of any road, except one, is on the St. Louis, Iron Mountain & Southern, main line, which is $12,000 per mile. The exception is the Little Rock Junction Road which is less than two miles long, and is put down at $250,000 per mile. This road includes a bridge over the Arkansas River.

Railroads in Formosa.

The Imperial Chinese Government has given the Governor of Formosa authority to make the proposed railroad in that island an imperial concern, and its construction from Kelung to Chang-hua will now be prosecuted with government funds. The work was begun over two years ago, but the management has been bad, and progress very slow. It is proposed now to make Kelung, the terminus of the railroad at the northern end of the island, a port from which the products of Formosa can be shipped direct to foreign countries. The English engineers who have been engaged on the work on this road hitherto, report peculiar difficulties, which have prevented any successful work. The plans made by the engineers for cuttings and tunnels are approved by the government authorities, but the military officers in command of the soldiers who do the work, proceed to do just what they please and in whatever manner they see fit, so that the engineers' plans are constantly frustrated, and much valuable work has been entirely wasted.

* Some of the English locomotives were described in our sue of July 19.

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The compound idea is making way in the United States, beyond a question. We hear of four or five engineers or locomotive builders who are working out new designs for compound locomotives. It is stated that the Baldwin Works are building one of an original design for the Baltimore & Ohio. The odd theory was started some time ago that the Webb compound was brought over as a speculation, to advertise and exploit patented devices. To us it has never seemed necessary to hunt for any other motive than the praiseworthy one of a desire to get and spread knowledge of the latest locomotive practice. The presence of that machine on American soil has had a quickening effect on the mind of American mechanics, and whether or not those who put money into it are repaid for the expenditure, they can have the satisfaction of having done a public service.

A correspondent raises the point that, in order to turn a locomotive engine off the centre (in case the pistons move simultaneously or in opposite directions), it will be necessary to use a turning-engine of the same size as the main engine. One answer to this proposition might be that, with careful handling, there would be no danger of the engine stopping on the centre; but it will probably be more satisfactory to consider the question in its most unfavorable case. If a locomotive, with pistons arranged as suggested above, is stopped with engines on the centre, it will be necessary, in turning the wheels sufficiently to put the pistons in a favorable position to be started by steam, to exert a force equaling the frictional resistance of the train and locomotive. But since the pistons are to be moved only a slight fraction of the stroke, and the turning-engine can be operated at a high velocity, the latter may be geared to the wheel so as to increase the mechanical effect. Suppose that the weight of the train and locomotive is 500 tons, that the frictional resistance is 10 lbs. per ton, that the turning-engine is geared 12 to 1, has a mean pressure on its piston of 100 lbs. per sq. in., and that the efficiency of the engine and gearing is 50 per cent. It will be seen that the prejudicial resistances assumed err, if at all, on the safe side. According to the assumptions, the resistance to turning the engine is $500 \times 10 = 5{,}000$ lbs., which will require a pressure on the piston of the turning-engine of $\frac{2 \times 5{,}000}{12} = 833\frac{1}{3}$, say 900 lbs.; and this would call for a cylinder having a diameter of about $3\frac{3}{4}$ in. The conclusion reached by our correspondent was caused by his neglect to consider that the motion to be produced by the turning-engine is very slight, and can easily be effected by a small cylinder; while the great power exerted by a locomotive in starting a train is due to the fact that the train must be brought to speed in a short time—an operation which requires the development of considerable accelerating energy, and, in consequence, much larger cylinders, relatively.

What is a superintendent for? One of those who recently succeeded in having his men examined for color-blindness, and who found some bad cases among his passenger runners, had been trying for five years to convince his superiors of the necessity of taking this step. Directors when talking about a selection that they have made for such an office, will expatiate on the ability, good judgment, broad-mindedness and experience of the individual they have appointed; but what is the value of all these good points if they are to be overruled by the arbitrariness of those whose eyes are wholly taken up with a narrow view of the profit and loss acconnt?

That it is desirable for a person to be fully acquainted with the methods of performing any work which he attempts to supervise, is generally regarded as an axiom, and that such knowledge is often indispensable to success is equally true. This is recognized in many departments of railroad operation. "Learn to obey before trying to command" is laid before beginners as a cardinal principle in this as in other kinds of business. A section master must have had actual practice in tamping and spiking before he can skillfully "boss" other men in that work. An assistant division engineer who does not possess practical knowledge of track work tries very hard to get some of that knowledge if he is wise. Presidents recognize the principle by compelling their sons, whom they hope to make managers, to serve a time as fireman, machinist, freight clerk or in some other important department: and those who fully realize the bearings of the case see that the young men get the benefit of apprenticeship in several departments. All this is good, and the chief thing to regret is that there is not more of it done. Every young man, whether he be president's son or an original genius direct from the backwoods, should be given varied experience, if it is intended to make an efficient officer of him. But what led us to mention this matter just now was a novel news item from Louisville, which is to the effect that the train dispatchers of the Jeffersonville, Madison & Indianapolis are each working a month in the capacity of freight conductor. They take turns, one at a time, and their train service includes a number of trips on every freight train shown on the time-table, including the locals. This is a commendable scheme and one that should be imitated. Every one knows that an operator who has been on trains a good deal makes the best dispatcher, and that those who have never been out of sight of their sounders labor under constant disadvantages. The J.. M. & I. dispatchers, if they are of the ordinary kind, who have never had a chance to get practical experience outside their offices, will doubtless receive enlightenment on numberless points, and will be able to direct trains much more efficiently on their return to the key. Dispatchers often get "cross, kinky and irritable" simply because they do not appreciate conductors' difficulties. Where sidings are short and trains are long a dispatcher often seems to think that all that is necessary is to make a meeting point for two trains at a side track, not stopping to consider whether the side track will hold either of the trains or not. To him a side track is a side track, whether it is 100 or 1,000 ft. long. A little actual experience on both sides of the question will smooth out these wrinkles.

In last week's issue and also in this, we present numerous notes of train accidents in Great Britain. These reports will be found worth reading, as they contain much matter of interest upon points which come up in railroad practice here as well as in other parts of the world. These points are not of a kind which American railroad officers are ignorant of, by any means, but many of them do belong to that class which are very little discussed here, either in print or in conventions of railroad men. For this reason American superintendents are much better posted concerning their own practice than they a re in regard to that of their brethren in distant parts of the country. One of the most pronounced criticisms heard concerning the work of the British inspecting officers is that they are inclined to be over nice in their requirements; that, to use a little American slang, they are addicted to "drawing it too fine"—very fine, in fact. The motive for such a course may be the somewhat reprehensible one of magnifying one's own office, or it may lie in the feeling that government supervision of railroads is a ticklish business, and that a consideration of the wide-spread feeling that government intervention may lead to less vigilance on the part of railroad officers demands that the standard of requirement shall be maintained at the very highest notch. There are several illustrations of this spirit, as shown in the inspectors' decisions. One is the opinion that where a passenger train stands at a terminal station, the engineer must not start until he sees the signal pulled down, even if he has 500 ft. or more to traverse before reaching the signal. Another is that where the changing of a curve from 660 ft. radius to one of 545 ft. is complained of, although the track is within a station yard. It seems that the railroad companies do not split hairs if the government officers do. They are quite like some roads we know of on this side of the water. It is clear that England is substantially a free country. At Stoke-Newington, where the cause of an accident was undiscoverable, the worn state of the rails was mildly criticised, but it does not appear that they were not of good average strength. Two or three cases appear in which there is certainly no need of fine work on the part of the inspectors. Where a car about like a common American 4-wheeled caboose is run in the front of a passenger train at 50 miles an hour, a derailment should certainly be no great surprise. It appears that there were two cases of this kind. Instances of insufficient brake power are somewhat plentiful, and it is to be noted that one of the most glaring cases is on the London, Chatham & Dover, a road which in other directions is noted for its enterprise. The one notable instance of the opposite nature, where a train going at 50 miles an hour was stopped in 630 ft., should certainly confirm the purposes of all who have any intention of perfecting their brakes. General Hutchinson, it will be noticed, does not hesitate to address himself to the whole body of English roads when he suggests a conference of locomotive superintendents on the question of examination of axles. That the English move deliberately, however, in this as well as other matters, is evidenced by an item on this topic which we notice in the last issue of *Herapath's*, wherein it is stated that Sir Michael Hicks Beach, President of the Board of Trade, in reply to a question in the House of Commons, stated that this conference was to be called, but that it would not be held until after the holidays. The proper construction and wording of circulars of instruction is somewhat neglected in England, as well as in this country, as appears from the Staddlethorpe case. General Hutchinson discusses this collision at great length, enlarging on the necessity of instructing firemen as well as runners about signals.

Railroads of the United States in 1888.

Poor's Manual for 1889, giving statistics of the railroads of the United States for the fiscal year of 1888, and the Annual Report of the Inter-state Commerce Commission, giving statistics of somewhat the same kind for the year ending June 30, 1888, appear almost simultaneously. A close comparison of the two works is not possible, for they do not cover the same ground. Poor's reports are for the fiscal years of the companies, which would give an average year ending perhaps in September: while the report of Prof. Adams, the statistician of the Commission, is for the year ending June 30. Again, Poor gives the liabilities and assets of companies owning 154,276 miles: Adams gives like statistics for companies owning 136,884 miles. Poor gives results of operation for 145,341 miles, Adams for 136,884.

The first obvious difference in the reports is on the fundamental question of the amount of railroad mileage. The Commission gives 149,902 miles, June 30, 1888. The Manual makes 156,082 miles, Dec. 31, 1888. In the last half year of 1888 about 3,000 miles of track were laid, which leaves still a difference of 3,180 miles between the two statisticians. Professor Adams is confident that his figures "err, if at all, in being too large rather than too small," and he may be right. The increase of mileage for 1888 is given by Poor as 7,028. Our returns of new construction gave 6,900 miles of main line track laid in the year. Poor's increase, therefore, probably includes all of the new construction of the year, although he deducts from the final total 420 miles of logging, mining and abandoned road that had been included.

Certain statistics reduced to a mileage basis in the two reports may be compared. Of course, the averages of the Inter-state Commission may be changed considerably when the whole mileage treated in the Manual is included. In the following comparison the figures of the commissioners are for 136,884 miles. Tnose of the Manual are for 154,726 miles of "completed road" or 154,341 miles of "road operated."

	Poor.	Commission.
Stock per mile	$28,768 (completed road)	$28,232.
Funded debt per mile	29,972 " "	28,266.
Cost of road, etc., per mile	60,732 (road operated)	59,392.
Passenger earnings per mile	1,729	2,090.
Freight " " "	4,397	4,480.
Per cent. of operating exp.	68.72	65.34
Receipts per pass-mile	2.246 cts	2.349cts
" " ton-mile	0.907 "	1.001 "
Dividends pd on stock, p. c.	1.77 "	2.06 "
Int. pd. on bonds and debt	4.17 "	4.24 "
Total pd stock, bonds and debt	3.03 "	3.06 "

It will be seen that there are some very important differences in these items, and differences which cannot be accounted for or explained by any data given. The difference in the revenue per ton-mile, for instance, is one of great significance. The Manual makes this less than last year by 0.127 cent. For the last six years the receipts per ton-mile have been:

1888.	1887.	1886.	1885.	1884.	1883.
0.907	1.034	1.042	1.057	1.124	1.236

The freight traffic in 1888 was 70,423,005,988 ton-miles, an increase over 1887 of 14.4 per cent. Had the average rate of 1887 been maintained, the gross earn-

ings would have been over $89,000,000 greater than they actually were. This one item would have paid two per cent. on the capital stock of the roads. Here is presented in a very impressive way the one most serious fact that now faces the railroads of the country—the fact that freight rates are falling, not only steadily but rapidly. From 1883 to 1884 they fell 9 per cent.: from 1884 to 1885, 6 per cent.; from 1885 to 1886 and from 1886 to 1887 they fell 1 per cent. each year, and from 1887 to 1888 they fell 12 per cent. To be sure, the net revenue has been seriously affected by the increase of the ratio of operating expenses to earnings the last two years. For six years it has been:

1888.	1887.	1886.	1885.	1883.	1883.
68.72	64 45	63.84	65.12	65.21	68.78

But even the great increase in 1888 made a difference of but $40,000,000, while $89,000,000 of possible net revenue was lost by the decline in rates. The effect upon the value of railroad property of this great fact cannot be arrested by the publication, from day to day and month to month, of statements showing the increase of gross earnings as compared with preceding years. Along with the decline in rates goes a decline in the earnings of the capital invested in railroads. The Manual gives the following figures of the per cent. of interest and dividends paid in the last six years on stock, bonds and debts:

	1888.	1887.	1886.	1885.	1884.	1883.
Bonds	4.35	4.71	4.75	4.77	4.66	....
Bonds and debt	4.17	4.55	4.53	4.62	4.51	4 59
Stock	1.77	2.18	2.04	2.02	2.48	2.75
Stock, bonds and debt	3.03	3.40	3.26	3.36	3.52	3.68

These figures ought to be made familiar to every legislator and to every voter in the country. Professor Adams gives others that are quite as striking. He finds that 61.44 per cent. of railroad stock and 21 69 per cent. of bonds pay nothing at all; and 74.26 per cent. of the stock and 45.41 per cent. of the bonds pay less than 5 per cent. Less than 26 per cent. of all the railroad stock of the country pays 5 per cent. or upward. Of course these facts are not altogether new to those who keep watch of these matters, but by the great mass of people they are not known, and those who, for their own interests, wish to keep alive the strange delusion that the railroads are the enemies of the people are careful not to call attention to them. Of course low rates are a public benefit to a certain point, but of course there must be a point below which they cannot go without public injury. Whether or not that point has been reached in the United States in general will soon appear.

Poor attributes the very low rates of 1888 to the struggle for the control of the Southwestern and Western territory by extensions, short crops, the action of the Inter-state Commerce law, and finally to hostile legislation in the states. These causes are now well understood, but the remedy is what everybody is seeking for. If it is not soon found in a change in public sentiment resulting in laws less irrational, and in greater care by the higher officers of the roads for the interests of the properties intrusted to them, it probably will be found in extensive consolidations.

The passenger rate was 2.246 cents per passenger mile, 0.03 cent less than in 1887, 0.065 more than in 1886, 0.048 more than in 1885, 0.11 less than in 1884, and 0.176 less than in 1883. The changes in this rate in recent years have not been such as to show the action of any law. They have varied from year to year according to the special circumstances of each year. This is true also of the ratio borne by the earnings from passenger traffic to total earnings. That ratio has averaged for the last six years 26.34 per cent., and the fluctuations one way or the other from the average have been slight.

The considerable increase in the ratio of operating expenses to earnings has been mentioned. This ratio was greater than in any year since 1883. It was 68.72 per cent. as compared with an average of 64.65 per cent. for the four years immediately preceding. There were two principal causes for this increase. The year was remarkable for large expenditures for betterments charged to operating expenses. That was a feature often noticed in the annual reports of the railroads. The year was also remarkable for the great amount of new line brought into operation in thinly settled countries. The line built in the year 1887 aggregated nearly 13,000 miles, and of this over 8,500 miles was in the northwestern and southwestern groups. On these lines of thin traffic the operating expenses must have been relatively heavy.

Following some statistics of operations for five years are placed in comparison. They are expressed in millions:

	1888.	1887.	1886.	1885.	1884.
Gross earnings	$960	$940	$830	$773	$771
Net earnings	302	335	301	269	268
Interest paid	207	204	189	187	177
Dividends	80	92	82	78	93
Passengers carried	451	428	382	351	335
Passenger-miles	11,191	10,570	9,660	9,134	8,779
Tons carried	589	552	434	437	399
Ton-miles	70,423	61,561	52,802	49,152	44,725

The Master Mechanic of the Future.

When the steamship "City of Paris" made her famous eastward trip, breaking all previous records, the writers for the daily press were at first loud in their praises of the skill and ability displayed by the captain. But a few of the more intelligent and thoughtful journalists were quick to perceive that the success of a modern steamship is largely due to the mechanical staff, and that the chief engineer of the "City of Paris" was entitled to at least an equal share of the glory awarded to the captain. What is true concerning the modern steamship has a similar force in all the arts and sciences of which steam machinery forms an important part. Whether we look to the factory, the electric light plant, or the railroad, we find the grimy engineer a valuable and indispensable adjunct; while over him is the controlling genius who contrives, builds and supervises the plant—the individual who is known by the various titles of chief engineer, superintendent, manager, consulting engineer, master mechanic, or superintendent of motive power. When one considers the great complexity and numerous ramifications of an engineering plant—and for convenience, the illustration may be limited to railroad engineering—it is easy to see that the designer and superintendent of it should not only be a man of considerable natural ability and experience, but also a person with a mind broadened by study and research. It may be worth while to glance for a moment at the various engineering branches to be found in a modern railroad plant, all of which should be thoroughly familiar to the master mechanic or superintendent of motive power.

It is not the simple question of designing a locomotive according to well-established principles, which is presented; because it is hardly saying too much to assert that there are no well established principles of locomotive design, that is to say, well-established, in the sense of being generally accepted. Judging from examples of recent practice, it may be fairly said that there are many open questions about matters of great importance, such as the following: Should the prime movers be simple or multiple expansion engines? What is the best proportion for cylinders?—for driving wheels? What are the best materials, proportions and types of locomotive boilers? What is the best form of piston packing, of piston-rod and valve-stem packing? What is the best mode of counterbalancing, etc., etc.? Moreover, there are engineers who think that the steam locomotive is in a state of transition, and even in danger of being displaced by some other form of motor. Again, the locomotive is not only required to haul cars, but quite likely it is desirable to light and heat these cars from the locomotive: so that the designer of the plant must consider the principles and relative advantages of lighting by oil, gas and electricity, and must decide between the various systems of heating the claims of which are so conflicting. Many railroad companies are largely interested in traffic by water, operating ferryboats, tugs, lighters and colliers; so that the master mechanic or superintendent of motive power should have some familiarity with ship building and marine engineering. The extensive scale on which railroad companies not only repair but also construct their motive plant, necessitates the erection and operation of extensive machine shops, boiler shops and foundries; and the economical and efficient management of these factories calls for modern tools and processes of the most approved design.

In this brief enumeration of the details of a railroad engineering plant, only the salient features have been presented. Much might be added in reference to the operation of these various branches, and especially to features of the economical running of locomotives. It may be assumed that every officer in charge of railroad motive power has two principal objects in view: to introduce all improvements which are really valuable, in designing and constructing new locomotives, and to operate the serviceable locomotives of the plant as economically as possible, and that if there is any failure in either of these particulars, it is from lack of knowledge rather than designedly.

The superintendent of motive power who is able to solve such problems as have been outlined above, can only acquire this ability by hard work. He must first have mastered both the theory and practice of his profession, in order that he may be able to understand and explain the reason for a certain detail or a certain mode of operation; and he requires the practical experience, so that he may exercise an intelligent supervision over details of construction. The theory of engineering is not—as some "practical" men sneeringly assert—a scientific refinement entirely antagonistic to practice; at least this cannot fairly be asserted of true theory. Theory, in its broadest and best sense, is an orderly and systematic arrangement of the laws by which natural forces (such as light, heat, electricity) are controlled: and a thorough knowledge of these laws must be useful to engineers who wish to control the natural forces and secure the greatest efficiency. The difference between the practical man and the theoretical man is generally misunderstood; and while it may be freely admitted that a man who has theoretical knowledge (derived from books) only is less valuable to the community than one whose knowledge has been acquired by practical experience, the man who possesses true theoretical knowledge can only have gained it by both study and practice. With this understanding, the comparison is less advantageous to the practical man, who only knows a thing because he has seen it or done it, and is in consequence somewhat prejudiced and narrow-minded; while the theoretical man adds to the practical experience of the other the faculty of reasoning about different courses of action, with a good chance of reaching a conclusion untrammeled by personal prejudice. The information obtained from study and a well-selected course of reading is not the only benefit received by the student; his mind is strengthened and his ideas are broadened. Now a man occupying the important position of master mechanic or superintendent of motive power ought to know the general state of the art over which he presides; and he ought to be sufficiently free from prejudice to examine carefully all alleged improvements relating to his business. It will ever be true that "knowledge is power," with the qualification, of course, that the knowledge should be useful and relevant to the student's profession. Many observers of human nature have remarked that ignorant men have the most self-assertion and prejudice, and that the more a man learns the more ignorant he thinks himself, but the more anxious he is to find out things. This is only another way of saying that as the ideas are broadened and general information is increased, one sees the difficulty of arriving at absolute conclusions concerning many practical problems, but is none the less desirous of attaining the closest approximation; while the practical man is convinced that his approximation is the exact solution, incapable of improvement. Of two such men, it is easy to see which would be the most valuable to a railroad company. The standard American locomotive has nearly, if not quite, reached its highest development in its present form, as is perhaps best evidenced by the many modifications which have been brought out in recent years; and probably no thoughtful engineer, however conservative, believes that improvement is to stop here. Who will be the most likely to encourage and promote the adoption of real improvements—the man of precedent, who objects on principle to everything new because he is ignorant of everything except his own practice and does not recognize the signs of the times, or the man who is familiar with current engineering literature and practice, and who has acquired by intelligent study the requisite judgment for critical examination?

Complaints Against the Alton.

At last the situation west of Chicago has been brought before the Inter-state Commerce Commission for a decision on the principles involved. The Rock Island complains because the Alton accepts for its haul from Kansas City to Chicago what is left on through shipments from Kansas, after allowing the Kansas roads their local to Kansas City. It is contended that the Alton is not an original party to the through rate, and has, therefore, no right to make itself a participant therein. Every railroad man knows that a system owning a through line has it in its power to offer inducements to shippers not to divert their traffic at any point en route, aside from any rate question at all. Facilities, dispatch, the prompt furnishing of cars and the like are often more powerful even than rates, and if the Rock Island cannot hold its own ground, its officers are not as keen as we think they are.

As to the immediate question the Alton seems to have at least an even chance of being in the right. A through rate is a through rate: it is a question whether the Rock Island has not broken it by the privileges granted to live stock at Kansas City, as much as the Alton has by getting the stock after the owners have been allowed to "try the market" there. The Chicago, Milwaukee & St. Paul is keeping very quiet on these points. If it insists on a share of this through cattle traffic at Kansas City, it virtually abandons the principle supporting its old milling-in-transit claims in the Northwest. In the few cases decided by the Inter-state Commission, wherein the question was raised, What constitutes a through rate? the Commission has taken in general pretty broad grounds. If the property was really shipped through, it is a matter of minor importance whether the through rate is prorated on

percentages or whether a fixed charge (less than the local) is made by any carrier on the way. According to this the Alton is safe as to the Kansas cattle traffic, and the Rock Island will have to stop the diversion by other means. The decision may hinge upon the intricate question whether a road may maintain an agency at an initial point off its own line and there make binding rate agreements. When the Chicago & Alton was refused representation in Eastern ticket offices it established new agencies of its own and secured passengers in spite of the Eastern roads. The question of rates did not come up. If the existence of a bill of lading naming a through rate is made the test in deciding what is a through shipment, the question will be as to whether any other than the initial road can issue a bill of lading. Every one knows that the Fast Freight Lines have done substantially this for years.

A second complaint is brought by the Inter-state Commerce Railway Association because the Alton has leased 400 of its common cattle cars to the American Live Stock Commission Co. at a rental of $6 per month per car. As the mileage paid upon these cars at ¾ of a cent would amount to probably $12 per month, it is claimed that a practical rebate of $6 per month is thus given shippers. On the face of it this seems clear enough, and yet there are difficulties in the way of making any thing out of it practically. The Alton claims that other roads carry as many of those cars to Chicago as it does, but perhaps none of them take many there. If the Alton makes no distinction between shippers on its own road, it is hard to see how any charges lie against it for discrimination. The fact that the Alton hires out its cars and that the Rock Island does not, is something with which the discrimination clause of the Inter-state law has no direct concern. It is indeed true, as has been before pointed out, that a discrimination between two shippers is just as bad in its effects when made by two different roads as when made between the same shippers on one and the same road. But upon the latter case the Act to Regulate Commerce bears down heavily, while on the former it is silent. So if the Alton rents out all its cars to its shippers, the competing roads must make a similar reduction; appealing to the commission is useless.

So, too, the so-called palace cattle cars complicate matters. Cattle shippers are preferring the improved cars more and more. If the Alton, in order to utilize its equipment of common stock cars as against these private ones, makes a reduction in charges for stock in its common cars, it would be a difficult matter to prove discrimination, for the whole subject of private ownership of cars, and of what is a fair mileage charge for foreign cars, would be brought up. There is another point. It is understood that the rented Alton cars are to be used as far as possible on the enemies' roads in Kansas. Mileage on them is, of course, in such a case paid by other roads than the Alton. If the lessees of those cars use them west of Kansas City, and transfer their cattle to palace cattle cars on the Alton at Kansas City, and if by some such arrangement they realize out of the Kansas roads a profit of $6 per month (not paid by the Alton, of course), is this discrimination?

The root difficulty in this and similar cases is the fact that the law is limited in its application. It has no provision for regulating the relations between road and road, and it does not expressly forbid any one of a dozen things that a road may do outside of its function as a simple carrier, for the purpose of worrying its competitors. What one road does as between the shippers on its own lines is certainly important, but what different roads do as between different members of the same trade or class throughout the community is certainly no less so. The former cases are reached by the law, the latter not. If the Alton may let out cars for use in Kansas, it may perhaps lease them next year in Texas or California. Suppose it should sell all its stock cars or convert them into box cars, and then instead of letting cars at a low price hire them at a high price, as the Chicago, Milwaukee & St. Paul has done with refrigerators? What does the American Live Stock Commission Co. want of these cars? Why does it not use cars furnished by the roads in the ordinary way? The difficult questions that have appeared in the complaints against roads which own coal mines are to be found in more than one department of railroad operation; and, like impurities in the human system, whenever an important depuratory is stopped up they break out. The commission, in order to assume jurisdiction in these complicated matters, will apparently have to fall back on its general authority to "inquire into the management" and methods of railroad companies.

A firm in Peoria raises a novel point by complaining to the Railroad and Warehouse Commissioners of Illinois that the railroads of that city will not receive freight after 5 p. m. We judge the custom of limiting the hours for receiving goods to be general in the larger towns. In New York the freight stations generally will not accept freight after 4 o'clock, though they will take from all trucks in line at that hour, sending out a man to take the names and numbers of the trucks then in line, so that none may afterwards join the others. In the dull seasons the trucks are disposed of soon after that hour, but in busy times trucks have been known to wait in the line from 4 to 8 p. m. before reaching the platforms. Practically, therefore, the receiving is continued long after the limit. The New York teamsters are rather inclined to think themselves imposed upon, claiming that any limit at all would be unnecessary if the roads would only provide men and room enough to handle their shipments properly. Doubtless these teamsters would not object if a road's entire surplus over operating expenses were devoted to paying for men and buildings so that there might be no delay to their horses. In spring and fall the gangs of freight handlers work till midnight sorting and loading the quantities of boxes and barrels delivered at the platforms from the drays in line at 4 o'clock. It might be possible to secure more expedition in busy times by increased force, though there is an evident limit to the number of men who can be economically employed. We do not know of any case which has been before the courts upon the question of length of time freight stations should keep open. It is supposed that they will follow the general business customs of the community, and in New York, on traffic which competes with boats, these same stations will receive at certain doors up to 6 o'clock. It ought to be an easy matter to determine in Peoria whether undue advantage was taken of the shipping public by a 5 o'clock limit. At competitive points it would seem as though self-interest would naturally lead a road to keep its doors open as long as it could get business thereby. If teamsters customarily work until 6 p. m., a road which refused to keep its loaders and bill clerks at work until 7 would in many cases be outflanked by another that would work until 8 if necessary. The best argument, however, with which to defend early closing is one based on the question of dispatch. If it can be shown that freight loaded at 5 o'clock will reach destination at a more favorable hour than that sent later, the shipper will come early of his own accord. This is substantially the case in New York. Although the nominal hour is 4, the average actual hour is 6 or 7; and that is as late as freight can be received and get a favorable start on the road.

The appointment by the Mayoo of New York City, of general committees to organize the proposed exhibition of 1892—committees on Permanent Organization, Finance, Legislation and Site and Buildings—has recently been announced. So much depends upon the character of the citizens selected for these important positions, that many persons, who viewed with something worse than disgust Mayor Grant's sacrifice of everything but political advantage in his appointments to city offices, were agreeably disappointed by his course in regard to the exhibition. The committees selected comprise 57 named by the different trades and industries, and 43 chosen from the city at large. The whole list includes some of the best-known and most influential men in the community. The names of the appointees representing mechanical and engineering trades are as follows:

Architects, Richard M. Hurt; *Domestic Steamships*, John H Starin; *Mechanical Engineers*, Henry R. Towne; *Civil Engineers*, John Bogart; *Elevated and Suburban Rapid Transit Roads*, Jay Gould; *Express and Freight Transportation Companies*, Thomas C. Platt; *Foreign Steamship Companies*, Hermann Oelrichs; *Hardware*, John H. Graham; *Iron*, Abram S. Hewitt; *Machinery and Railroad Equipments and Supplies*, Charles A. Moore; *Plumbing and Steam Fitters*, Charles J. Gillis; *Railroads*, Chauncey M. Depew; *Scientific and Educational Interests*, Charles F. Chandler; *Shipping*, Ambrose Snow; *Street Railroads*, Cornelius Vanderbilt. The electrical industry had not agreed upon a representative at a time when the committees were announced; and the appointment, together with several others, will be submitted by the Mayor to the Committee on Organization. Meetings of the Committees on Finance and Site and Buildings have been called for Tuesday and Thursday, respectively, of next week, it being necessary for these committees to take the initial steps before the other committees can act. The appointments seem to have given very general satisfaction, judging by the tone of the daily press, which is rarely in accord about any matter whatever, and the exhibition is apparently launched under very favorable auspices. The committees will find no lack of gratuitous advice, for letters on the subject are received at the Mayor's office in reams.

The New York and Chicago limited trains of the Pennsylvania have just received their finishing touch, a car partly taken up with sleeping apartments and containing a ladies' bath room and "observatory" windows in one end having been provided for each train, to be run at the rear end. The new cars are from the Pullman shops, and, as usual, excel all previous efforts in the way of splendor. It will be remembered that the Golden Gate special and other special trains brought out within the last year or so have had a car of this kind. It is to be remembered that a hotel differs from a hall furnished with settees chiefly in that it has rooms specially adapted to varied purposes: a traveling hotel should aim at the same completeness, and a parlor from which can be had agreeable views is only a proper adjunct of the other luxuries. All railroad men and many common mortals know that the only place on a train from which to get a satisfactory view of the surrounding country as it is rapidly traversed is the rear end; but the placing of lavatories in ordinary coaches, the increasing use of sleeping cars, and other causes have now made it difficult for the ordinary passenger to get a seat at the rear end of trains; he must put up with the eye-straining panorama visible from the side windows or lose the whole. Limited trains which run long trips without taking or leaving cars are, however, the only ones on which a certain car can be regularly kept at the rear. The general use of trains of this kind, in which all or many of the cars must always be run in the same relative position in the train, again suggests the desirability of providing Y-tracks wherever possible, on which to turn them; and the numerous couplings now necessary (automatic drawhead, safety chain, air brake, air signal, steam heat and electric light) give added emphasis to this necessity. The use of combination baggage and smoking cars, by which is obviated the wastefulness of running a whole car for the purpose of carrying 30 or 40 trunks is a noticeable feature of the costly trains lately introduced. It is gratifying to observe even a small saving to offset the enormous expense which the exigencies of competition now seem to render necessary.

Odd bits of news seem to spring up naturally nowadays, and the imaginative faculty of the reporter is not so severely taxed as might be supposed. Among the items out of the ordinary run recently reported from Chicago is one to the effect that 11 one-armed switchmen on the Chicago & Northwestern had struck for an advance of wages, and another that the Lake Shore & Michigan Southern had found it necessary to discharge all of its crippled crossing tenders. It is stated that the switchmen were backed up by the able-bodied switchmen, and that they won their point. Whether the wages they received were high or low, or greater or less than those of other men doing the same work is not stated. The Lake Shore item seems to be somewhat exaggerated, the action taken, we understand, having been confined to the city of Chicago. The aim of all decently-managed roads is to provide employment for crippled employés, which shall be both reasonably profitable to the company and fairly remunerative to the individual, as well as of a kind fully within his capabilities. If the Lake Shore has had one-armed, or one-legged, or infirm men to attend highway crossings at much-used city streets, we should say that its mistake, if any, has been in not changing them before; and any public sympathy wasted on the supposed ground that the company has perpetrated an extensive act of injustice upon its unfortunate employés wholly misplaced. Happily, there are, on most roads, a good many country crossings, where the duty of the watchman is substantially nothing but to watch and to wave a flag. Where there is much travel it is, unfortunately, true that the attendant must not only give fair warning to people when trains approach, but must often use force to properly convince headstrong men and horses. For this work able-bodied men should be, and we believe generally are, employed.

"The First Annual Report on the Statistics of Railways in the United States to the Inter-state Commerce Commission" has recently appeared. The report consists mainly of five tables. Each of these tables contains the names of 1,483 railroad companies arranged in alphabetical order, and consecutively numbered. Table I. gives the mileage owned and operated, and the name of the company operating each line; table II. gives the amount of capital; table III. gives the earnings and income; table IV. the expenditures, and table V. the payments made on capital. The tables are excellently arranged and printed for convenient reference, and each title is subdivided carefully. Table II., for instance, has 17 columns. The stocks are given by amount outstanding, amount per mile, proportion to total capital, proportion of common and proportion of preferred. The bonds and the other forms of indebtedness are similarly classified. All of the tables are treated with like care. The tables are preceded by an introduction explaining them and discussing some of the deductions from them. We have recently spoken of the general scheme of statistics as laid out by the Commission, and elsewhere we compare some of the figures of this report with those of Poor's Manual. The report is so arranged and condensed as to be very convenient for certain purposes, but it does not take the place of Poor's Manual except for students of general statistics. The investor will not find in it the compact history of each road, of its physical condition, organization, operation and financial results which he wants, and which is given in the Manual. As a body of general statistics, however, the reports of the Commission are of great interest and value.

The reader has probably noticed that the passenger department of the Pennsylvania has been making good use of the Johnstown disaster as an inducement to patronize its Chicago limited and other trains passing the scene of the floods by daylight. It has proved a very successful "card," for we hear that the increased receipts from tourists who have been led to take this route in order to see the desolation wrought by the waters have already more than made up the losses in passenger earnings while the road was blocked.

The headquarters of the *Railroad Gazette* at the Paris Exhibition are at the office of T. R. Pickering, Superintendent of the United States Exhibit in Palais des Machines. This exhibit is classed as Group VI. At these headquarters visitors can obtain the latest copies of the *Railroad Gazette*. Mr. Harry Williams has charge of the office. His location is on the ground floor of the hall, about 200 ft. from and at the right of the main entrance, and is close to the exhibit of J. A. Fay & Co.

In the new locomotive shops of the Pennsylvania Railroad at Altoona, known as the Juniata Shops, all of the overhead

traveling cranes are to be run by electricity, each crane being furnished with an electric motor. The only exception to this will be the cranes for the stationary riveters in the boiler shop. These will probably be hydraulic, as it is the intention to work the stationary cranes, shears, punches and riveting machines by hydraulic power.

NEW PUBLICATIONS.

Steam-Engine Design: For the Use of Mechanical Engineers, Students and Draughtsmen. By Jay M. Whitham. New York: John Wiley & Sons, 1889. 8vo., pp. ix., 391.

This work has a motto on the title page: "Practice varies; but principles are eternal," which is a good key to the author's design: to state clearly the principles governing design and proportions, with many illustrations of actual practice. The conditions controlling the selection of a type of engine are, according to the author: Clearance, piston speed, friction, economy of fuel, weight and complexity of moving parts, accessibility for repairs, and radiating surface. After briefly discussing these points, the author passes to calculations of proper size of cylinder, thickness of cylinder and head, design of piston, proportions of stuffing-boxes, size of piston-rod area of steam ports, and numerous other details of engine construction; illustrating the details by good working drawings of modern practice and graphical sketches of valve motion, crank effort and the like. Considerable space is devoted to the design of multiple expansion engines, showing how the sizes of the different cylinders are calculated. In considering rules for design and proportions, the author gives a variety of methods, in many instances, compares them with each other, and adds methods which he recommends. As an illustration of this statement the following results of calculating the cylinders of a compound engine by different methods, for certain assumed conditions, are interesting:

Method of design.	—Diameters of cylinder—inches.— High pressure.	Low pressure.
Rae	43 7-16	60 13-16
Direct exhaust between cylinders	41 3-16	52⅛
Rankine	31⅜	52⅛
Seaton	37 5-16	64
One graphical method	40¾	65⅞
Another graphical method	34 1-16	58½
Actual diameters	42	64

The work under consideration covers so much ground that a complete review would occupy too much space. These brief remarks indicate the general character of the treatise and its value. There is little to criticise in the book, because it is a practical essay written by an experienced engineer, who summarizes the results published in technical journals and modern works on engineering. It might have been well, in considering the subject of shafting, to say something about hollow shafts, which are often used in steamships, for the sake of strength and lightness. In the arrangement of the line shafting of a screw steamer, it is customary to employ flexible couplings or spring bearings or both; and omission of all reference to such connections is rather surprising in a work of this character. The only other omission of importance to be noted, is the question of counterbalance. The modern practice of high piston speed both on land and water has given great prominence to this subject; and it is a matter of regret that the author, who writes so well about many other details, has not even alluded to the principles governing the proper balance of steam machinery.

TECHNICAL.

Locomotive Building.

The Brooks Locomotive Works have received an order from the Toledo, Columbus & Cincinnati for a new switching engine.

The Rhode Island Locomotive Works have completed the last of the 60-ton class H engines recently ordered for the Chicago, Burlington & Quincy.

The Canadian Locomotive & Engine Co., Ltd., of Kingston, Ontario, has recently shipped the following locomotives: Two 49-ton moguls to the Northern Pacific & Manitoba and two of the same weight and design to the Quebec & Lake St. John line; three 43-ton eight-wheeled engines to the New Brunswick road; two 43-ton eight-wheeled to the Northern Pacific & Manitoba, and five of the same weight and pattern to H. J. Beemer, Quebec.

This company also has under construction five 40-ton moguls and five 43-ton eight-wheeled engines, and also a set of pumps for the city of Ottawa, the capacity of which will be 10,000,000 gallons in 24 hours.

The Schenectady Locomotive Works, of Schenectady, N. Y., turned out during the month of July the following locomotives:

Seven 19 × 24 moguls for the Lake Shore & Michigan Southern; two 19 × 24, 60-ton, ten-wheeled passenger engines for the Michigan Central, five 18 × 24 eight-wheeled and three 18 × 24 ten-wheeled for the Louisville, New Orleans & Texas; one 16 × 24 eight-wheeled for the Shelby Iron Co; one 9 × 14 narrow-gauge switching for the Phœnix Iron Co.'s rolling mill, and two 18 × 24 moguls for the Oregon Railway & Navigation Co.

Messrs. Thomas B. Inness & Co., of 115 Broadway, New York, have for sale for early delivery the following new standard gauge locomotives: Four 17 × 24 passengers; one 17 × 24 mogul; one 18 × 24 mogul, and one 17 × 24 shifting.

Car Notes.

The Carlisle Mfg. Co., of Carlisle, Pa., has contracts on hand for 100 cars for export to Cienfuegos, Cuba; 200 coal cars for the Pennsylvania, and a quantity of mining cars for various parties.

The Toledo, Columbus & Cincinnati last week contracted for the building of 100 34 ft. box cars.

The Lebanon Mfg. Co., of Lebanon, Pa., has recently furnished the following cars: 210 hopper bottom gondola cars, of 60,000 lbs. capacity, for the Georges Creek & Cumberland; 250 coke cars for the Bell's Gap road; 100 hopper bottom gondolas, of 60,000 lbs. capacity, for the Westmoreland Coal Co. The company has also contracted recently for 400 iron cars for the Iron Car Co., of New York.

The Keith Mfg. Co., of Sagamore and Hyannis, Mass., has recently received the following orders: Fifty 34-ft. box cars for the Old Colony; 50 hopper bottom gondolas for the Boston & Maine, and 40 gondolas for the New York, Providence & Boston.

The Jackson & Woodin Mfg. Co., of Berwick, Pa., is building 50 hopper bottom coal cars for the Delaware, Lackawanna & Western, and 400 hopper bottom gondolas for the New York, Susquehanna & Western.

The Harrisburg Car Mfg. Co., of Harrisburg, Pa., has recently taken the following orders, 200 box cars and 100 gondolas for the Iron Car Co., of New York; 200 hopper bottom gondolas for the Pennsylvania, and 400 oil-tank cars for private lines.

The Erie Car Works, of Erie, Pa., have the following contracts on hand: 100 coal cars for a New England road, 100 coal cars for the Rainey Bank Coal & Coke Co, and 300 gondolas for the Pennsylvania. The works have a capacity of 20 cars per day, and these orders will be soon filled.

Messrs. J. Harris & Co, St. John, N. B., are building six first class passenger cars for the Intercolonial; one first class passenger, one baggage, mail and express, 10 platform, and two box and one cattle car for the New Brunswick road; 40 platform cars for the Quebec & Lake St. John; two coal and two box cars for the Grand Lake Coal Co.; 50 four ton coal cars for the Sydney & Louisburg Coal & Railway Co.; two flat cars for the International Coal Co.; 10 flat and five box cars for the Great Eastern road.

The Jackson & Sharp Co., of Wilmington, Del., has just completed three handsome, first-class passenger coaches for the Flint & Pere Marquette, the interiors of which are finished in mahogany, with oak veneer ceilings, handsomely decorated, plush upholstered seats with the new gravity lock and tilting backs. These cars were mounted on the company's standard truck with 38-in Paige wheels. The firm has also just completed large contracts for different types of cars for the Quebec & Lake St. John and the Quebec, Montmorency & Charlevoix roads, and also has contracts with the Long Island, East & West of Alabama, and Chicago, Iowa & Dakota; and is just finishing a private car for the New York, Ontario & Western for the use of President Fowler.

Bridge Notes.

The ordinance providing for the erection of a new bridge over Cherry Creek, at Larimer street, Denver, has become a law. It is estimated that the bridge will cost $32,000, which amount has been appropriated.

The County Commissioners will build a 400-ft. bridge at South Thomaston, Me., to cost about $5,000.

The contract for the Louisville & Jeffersonville bridge, across the Ohio River, has been awarded to the Phœnix Bridge Co., of Phœnixville, Pa. The cost is estimated at $1,000,000.

The Columbia, Newberry & Laurens road has awarded the contract for the superstructure of the bridge over the Broad River, near Columbia, S. C., to the Edge Moor Bridge Co., of Wilmington, Del., at about $100,000.

The Connecticut River Railroad has ordered an iron bridge of the Boston Bridge Co., to span West River, near Brattleboro, Vt., replacing a wooden structure. It will be about 100 ft. long, with a bank span about 50 ft. long.

Messrs. Shailer & Schniglau, of Chicago, have been awarded the contract for constructing two draw-bridges on the line of the Chicago & Northwestern.

The Board of Highway Supervisors, of Philadelphia, has granted permission to the Philadelphia Traction Co. to erect an iron bridge over the Philadelphia & Reading road at Poplar street. The bridge will cost about $25,000.

The contract for a highway deck bridge at Fall River, Mass., has been awarded to the Berlin Iron Bridge Co., of East Berlin, Conn., at $9,887.

The town board, of Wilson, N. Y., has awarded the contract for the Daniels road bridge to the King Iron Bridge & Mfg. Co., of Cleveland, O.

Sealed bids will be received by the Auditor of Stark County, at Canton, O., until Aug. 23, for a bridge over the west branch of Nimisillen Creek, 125 ft. clear length.

Proposals were opened at the Mayor's office, of Baltimore, for manufacturing and erecting the superstructure of the Cedar avenue bridge as follows: Wrought Iron Bridge Co., of Canton, O., $32,599; Penncoyd Iron Works, of Philadelphia, $30,774; Groton Bridge Mfg. Co., of Groton, N. Y., $34 800; Youngstown Bridge Co., $35,490; Columbian Iron Works, of Baltimore, $48,450; Bartlett, Hayward & Co., $39,448; King Iron Bridge & Mfg. Co., of Cleveland, O., $30,000.

The County Commissioners of Cuyahoga County O., this week opened bids for the building of a bridge at Rocky River. The bids for the superstructure were as follows: The Youngstown Bridge Co., $44,300; the Mt. Vernon Bridge Co., $41,456; the Keystone Bridge Co., of Pittsburgh, $44,950; the Columbus Bridge Co., $47,940; the Variety Iron Works Co., $42,001.50, and the King Iron Bridge & Manufacturing Co., $39,950. A bid of $21,424.80 from J. A. Fisher, of Windham, was the lowest for the substructure, and that of the King Iron Bridge & Manufacturing Co. the lowest for the superstructure. Together these bids aggregate $61,374.80, which is $6,000 above the appropriation for the bridge.

Manufacturing and Business.

The Frost dry carburetted system for lighting passenger cars has been ordered for cars of the Union Pacific and the Louisville & Nashville.

Messrs. Thomas B. Inness & Co., have for sale five second-hand standard gauge bridges, three "through" and two "deck."

The Consolidated Car Heating Co., of Albany, N. Y., has issued a circular announcing that, having purchased all the patents, devices and properties of the Sewall Safety Car Heating Co. and the McElroy Car Heating Co., it will continue the business heretofore conducted by those companies. The company is now prepared to offer the most improved systems for heating passenger trains continuously by steam or hot water. Proposals or plans for the same will be promptly furnished on application to D. D. Sewall, General Manager, Albany, N. Y.

The new extensions being built by the San Antonio & Aransas Pass road are being equipped with pumps, boilers and tank valves manufactured by the Laidlaw & Dunn Co., of Cincinnati, Ohio.

The Railway Automatic Danger Signal Co., of Chicago, has been chartered in Illinois to manufacture automatic danger signals for railroads, etc. Capital stock is $250,000. Incorporators are James W. Steele, N. C. Gridley and David H. Fletcher.

The Keystone Car Coupler Co., of East St. Louis, Ill., has been chartered to manufacture and license the sale and use of car couplers, and to manufacture, buy and sell general railroad supplies. The capital stock is $1,500,000. The incorporators are: Stephen Johnson, G. H. Barnes and F. W. Crane.

Iron and Steel.

Edward Gough, of Allentown, Pa., has contracted to build a mill for the Carpenter Steel Co., of Reading, designed to roll crucible-steel rods of all sizes, small shapes of all descriptions, and steel plates. The company will occupy the old Philadelphia & Reading rail-mill. J. H. Carpenter is General Manager.

The Columbia & Susquehanna Rolling Mills, on Aug. 12, posted a notice announcing that after Aug. 19 they would pay puddlers $3.90 per ton, instead of $3.85, as announced a few days ago.

The New Jersey Steel & Iron Co., of Trenton, N. J., has secured the contract for furnishing six dynamite guns, each 50 ft. long, for the Dynamite Gun Co, of New York, who are having them made for the United States Government.

The Iron River, Youngstown and Florence ore mines, in the Menominee range in the Lake Superior district, were sold this week for $1,000,000 to Frederick Schlesinger, of Milwaukee, representing a syndicate of New York capitalists already interested in that region.

Preparations are now being made to start up the finishing department of the old Clinton Mill, which has been idle ever since the failure of Graff, Bennett & Co. This portion of the works will give employment to about 200 men.

The work on the new Edgar Thomson blast furnaces is being pushed forward as rapidly as possible. Two new furnaces are being built along side the present stacks at Bessemer, Pa. The foundations have been put down, and everything will be done to complete the new stacks without delay. They will have a larger capacity than the others, and will have all modern improvements.

A contract has just been awarded to the National Tube Works Co., of McKeesport, Pa., by the Northwestern Ohio Gas Co., for making 80 miles of large-sized pipe for the projected line from the gas fields of Northwestern Ohio to Detroit. Half of the line is to be of 12-in. and half of 16-in. pipe and the entire order will closely approximate $800,000.

The old South St. Louis Furnace, located on Krauss street, in Carondelet, Mo., has been sold to the P. P. Manion Machinery Co., of St. Louis, who will dismantle it to get the machinery and scrap iron. The mill was built over 20 years ago, but has not been operated for some years.

New Cars for the Pennsylvania.

In the car notes last week, we gave a list of builders who had been awarded contracts for building 3,000 freight cars for the Pennsylvania. The following gives the number awarded to each firm: At the Altoona shops, 500 hopper gondola coal cars and 500 long drop bottom gondola cars. All the others are hopper gondola cars, and the contracts were as follows: Peninsula Car Co., Detroit, 500; Murray, Dougal & Co., Ltd., Milton, Pa., 400; Pardee, Snyder & Co, Watsontown, Pa., 200; Erie Car Works, Erie, Pa., 300; Harrisburg Car Mfg. Co., Harrisburg, Pa, 200; Michael Schall, York, Pa., 100; Schall & Shoop, Dauphin, Pa., 100; Carlisle Mfg. Co., Carlisle, Pa., 200.

It is understood that the road will provide the money to pay for these and other new freight cars by issuing a new 4 per cent. gold freight equipment bond, which will be a direct obligation of the company and will run 25 years from Sept. 1. The whole of the issue, $3,000,000, has, it is stated, already been placed by the company through Messrs. Drexel & Co.

New Steamers for the Lehigh Valley.

The Lehigh Valley Railroad Co. has contracted with the Globe Iron Works, of Cleveland, O., for two additional new steel steamships, of 2,500 tons carrying capacity each, which are to be built in time for service at the opening of next spring season. The company's five steamers will enable them next season to operate a rapid high-class freight service between Buffalo and Chicago, steamers sailing from each port on alternate days.

Shipbuilding on the Lakes.

The Cleveland Shipbuilding Co. has contracted with the Lake Superior Iron Mining Co. for two steel steamers, 284 ft. over all, 38 ft. beam and 24 ft. hold. They are to have triple expansion engines with 17 29 and 47-in. cylinders with 36-in. stroke, fed by two 11 × 12-ft. Scotch boilers carrying 160 lbs. of steam pressure. The boats are to have water bottoms, and are to be fitted with the necessary pumps and windlasses, and with Williamson's steam steerers. They are to be completed May 1 next, and will cost $165,000 each.

Messrs. Wolf & Davidson, of Milwaukee, are building what the Milwaukee *Wisconsin* says is the largest and best steam carrier yet turned out from the yards of that city. She is a wooden vessel 306 ft. over all with 42 ft. beam. This width is only 50 ft. back of stem and the width tapers to 38 ft aft. The frames of this vessel are to have solid floor timbers bolted to them on each side, and the interstices calked with pine wedges so as to form a solid floor 16 in. thick, the whole to be diagonally strapped and thoroughly bolted, and the planking will be 5 in. thick. This is expected to make the strongest wooden vessel on the Lakes. She will have triple expansion engines with Scotch boilers.

Two Steamers Launched on the Delaware.

The new iron steamship "Kansas City," built at Roach's yard at Chester, Pa., for the Ocean Steamship Co., was successfully launched Aug. 10. The vessel is 350 ft. over all, 45 ft. beam and 27 ft. depth of hold. Triple-expansion surface-condensing engines will be placed aboard of her, and she will have a stroke of 54 in.; eight steel boilers, 12 ft. in diameter and 11 ft. in length each, with a working pressure of 16 lbs. to the square inch. The capacity of the engines will be 3,600 h. p., and the vessel is guaranteed to make 16 knots an hour. The vessel will have accommodations for 263 passengers. The state-rooms, which are to furnish accommodations for 116 passengers, will be finished in hard wood, while the other parts of the vessel will be finished in white. The hurricane deck will provide a social hall 90 ft. in length, while the dining saloon for the first-class passengers will be located on the main deck and be 103 ft. long. The dining room for second-class passengers will be 44 ft. long. When completed the vessel will ply between New York and Savannah.

The Harlan & Hollingsworth Co., on Aug. 10 launched the twin-screw iron transfer steamer "Express," built for the New England Terminal Company, to transport cars between Jersey City and Wilson's Point, Conn. Her dimensions are: Length, 273 ft., 24 ft. beam, and 14½ ft. depth of hold.

Reduction in Price of Air Brake Apparatus

The Westinghouse Air Brake Co. has issued a pamphlet announcing considerable reductions in the prices of materials. It has been decided hereafter to omit plain piping and pipe fittings from the schedules. This material is easily obtainable in all parts of the country, and there is in many cases a considerable saving in freight as compared with a shipment

from Pittsburgh. The new prices, without pipe, will be: For a locomotive, $275; for a passenger car, $100, and a freight car, $45. For pneumatic signal fixtures the prices are: For engines, $30, and for cars, $15. The actual net reductions, after allowing for pipe and fittings, are about 7 per cent. on engines, 23 per cent. on passenger cars and 4 per cent. on freight cars. The price of tender fixtures, $60, remains unchanged. The apparatus for operating all the wheels of a 12 wheeled car costs $120. Air pumps have been reduced from $200 to $125 and hose couplings from $5 to $2.50. The announcement is accompanied by an explanation of the increased cost and value of the material now furnished, as compared with older patterns, especially that for locomotives and freight cars. The quick action freight brake fixtures cost about 20 per cent. more than the original patterns, and the reduction is only made possible by the extensive plans and resources of the company and the confidence it has in the future expansion of business. The consistent aim of the company has been to constantly improve the brake, keeping it abreast of the demands made upon it, and to make all changes and improvements without interfering with brakes in use or with the principle of uniformity, or making any trouble for the users. Ten million dollars has been invested in Westinghouse automatic brakes in this country, and the company has yet to hear of an apparatus that has been worn out, so that this large investment stands today worth its full cost price. The prices now charged for material are so closely governed by the cost of manufacture that anything like a royalty charge has practically disappeared.

Rolled Steel Car Wheels.

The Continental Rolled Steel Car Wheel Co., of Norristown, Pa., has, after considerable experiment, developed a machine for rolling wheels from steel blanks. The company proposes now to establish a plant with a capacity of 100 wheels a day. The wheels will be made from either Bessemer or open-hearth steel, manufactured at Norristown. The machine was illustrated in a recent issue of the *Iron Age*. There are six rolls, two above, two below and two working against the rim of the wheel. It is thought that a pressure of 200 tons to the square inch will produce the best results, and it is said that the company proposes to furnish a wheel cheap enough to compete with the cast-iron wheel.

The "City of Paris."

The "City of Paris," in her last trip eastward, broke the record again, having reduced the time to something less than 6 days. She also has the westward record of 5 days 23 hours and 7 minutes. We are informed that her great performances are due to the fact that she had "magnolia metal" in her journal bearings. We had supposed that her lines, her machinery and boilers had something to do with her speed, but it seems not.

Power Brakes in Australia.

The South Australian Railway Commissioners have decided to adopt the Westinghouse automatic brake on the broad gauge, and the automatic vacuum brake on the narrow gauge lines in the Colony.

An Elevated Railroad in Liverpool.

The contract for the Liverpool overhead railway has been obtained by Mr. J. W. Willans, 28 Deansgate, Manchester. This important undertaking is the first of the kind in England. The total length of the line is about 6 miles. This statement gives some idea of the magnitude of the Liverpool dock system, when we add that the docks lie parallel to and along the whole length of the railroad. The structure is composed of iron girders, having a water-tight flooring (Hobson's patent) for the whole length, and is carried on strong wrought-iron pillars. It is intended to work the trains by electricity. The engineers are Sir Douglas Fox and Mr. J. H. Greathead. Mr. Willans is just completing the contract for the iron work for the City of London & Southwark Subway, which will probably be worked by electricity.—*Iron Trade Circular.*

Uniform Standard Time.

Mr. John Bogart, Secretary Am. Soc. C. E., issues the following circular:

I am directed to issue for the information of all concerned the following documents, viz: *First*—Report of the Special Committee on Uniform Standard Time, presented at the last annual meeting of the society. *Second*—List of railroad presidents, managers, superintendents, engineers and others who have at different times given expression in favor of the 24-hour notation.

The committee requests me to add: The report explains the progress made up to the present time in the movement for the adoption of the 24-hour notation. It is felt that the information is of sufficient importance to be made generally known, especially to railway men throughout the country. The question may not appear of pressing importance to any single individual, but, taking into consideration the countless millions of people in all future time to be benefited by the successful adoption of the new notation of the hours of the day, attention to the report is respectfully invited. In promoting the movement for reforming our system of reckoning time, in order to secure uniformity, simplicity and accuracy, the American Society of Civil Engineers requests the sympathetic co-operation and assistance of all who are favorably disposed. Every man has it in his power to influence the movement; even a simple expression of opinion in its favor will do so. All, therefore, who may be so inclined, are invited to fill up the accompanying form and transmit it to the Committee, care of the Secretary.

I am.... ...in favor of the adoption of the 24-hour notation so soon as it may be found that a considerable majority of all the railway companies will agree to its simultaneous use on their lines. Should a general assent to its adoption be first expressed, I think the change might be effected in the year..... Here follow name and address.

New Car Building Shops.

The J. G. Brill Co., of Philadelphia, recently purchased 18 acres of ground just above Gray's Ferry, between Woodland avenue and the Philadelphia, Wilmington & Baltimore road, upon which the company is now erecting a plant which will double its capacity, and at a cost of upward of $250,000. Buildings of corrugated iron and iron and brick are to be erected as follows: One-story drying house, 60 × 100 ft.; two 1-story erecting shops, each 120 × 178 ft.; 2 story machine shop, 60 × 120 ft.; 1-story blacksmith shop, 140 × 40 ft.; 1-story iron store, 140 × 40 ft.; 1-story pattern shop, 30 × 40 ft.; 2-story office, 60 × 40 ft.; 3-story storehouse, 100 × 40 ft.; 2-story wood-working mill, 80 × 125 ft.; 1-story boiler-house, 35 × 46 ft; 1 story engine-house, 20 × 50 ft. It is expected to have all the new buildings completed before the close of the year. The new plant will be supplied with much new machinery.

The Koyle Parabolic Semaphore.

The August issue of the *Journal of the Franklin Institute* contains a report of a committee on Science and the Arts upon this semaphore, which the *Railroad Gazette* has already illustrated. The committee report that Prof. Koyle has devised a signal not only as useful at night as during the day, but more conspicuous by daylight than the old forms, because of the brightness of the reflected sunlight. The committee finds that the red color is visible to the engine runner up to within 50 ft. of the post, and the distance at which it can be seen is much greater than with the ordinary arm. The mathematics of the form of the semaphore are developed in the same issue of the *Journal*.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Alton, quarterly, $2 per share on the preferred and common stock, payable Sept. 2.

Chicago & Eastern Illinois, quarterly, 1½ per cent. on the preferred stock, payable Sept. 2.

Chicago & West Michigan, semi-annual, 1 per cent., payable Aug. 15.

Cleveland & Pittsburgh, regular guaranteed quarterly, 1¾ per cent., payable Sept. 1.

Delaware & Bound Brook, quarterly, 2 per cent., payable Aug. 15.

Flint & Pere Marquette, 3 per cent., payable Aug. 15.

Kansas City Fort Scott & Memphis, semi-annual 4 per cent. on preferred stock and 1½ per cent. on common stock, payable Aug. 15.

North Pennsylvania, quarterly, 2 per cent., payable Aug. 24..

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Central New England & Western, special meeting, 115 Broadway, New York City, Aug. 30.

Nashville, Chattanooga & St. Louis, annual meeting, Nashville, Tenn., Sept. 11.

Nashville & West Nashville, special meeting, Nashville, Tenn., Oct. 9.

Ohio, Indiana & Western, annual meeting, Indianapolis, Ind., Sept. 11.

Ohio Southern, special meeting, Springfield, Ohio, Aug. 30.

Union Depot Railroad Co. of St. Louis, special meeting, St. Louis, Mo., Aug 20.

Terminal Railroad Association of St. Louis, special meeting, St. Louis, Mo., Oct. 1.

West Virginia & Kanawha, special meeting, 170 Broadway, New York City, Aug. 19.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *New England Roadmasters' Association* will hold its next meeting in Boston, Aug. 21.

The *Roadmasters' Association of America* will hold its seventh annual convention at Denver, Colo., Sept. 10.

The *Master Car and Locomotive Painters' Association* will hold its twentieth annual convention in Chicago Sept. 11. The headquarters are at the Tremont Hotel.

The *American Association of General Passenger and Ticket Agents* will hold its next semi-annual meeting in Atlanta, Ga., Sept. 17.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August. The next meeting will be held Sept. 11.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds its regular meeting on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m., on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 1,122 Gerard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p.m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at the Club rooms, No. 24 West Fourth street, Cincinnati, at 8 p. m., on the fourth Thursday of each month.

The *Engineers' Club of Kansas City* meets at Kansas City, Mo., on the first Monday in each month.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Club of Kansas* holds regular meetings on the first Wednesday in each month at Wichita, Kan.

Montana Society of Civil Engineers.

A regular meeting of this society was held July 20. The Committee on Irrigation submitted a progress report, which was made the basis of a general discussion upon the question of irrigation. A committee was appointed, consisting of Messrs. Sizer, Knight, Danse, De Lacey and Foss, to prepare a memorial to be presented to the Constitutional Convention, on the subject of state control of engineering works. A memorial was accordingly prepared and presented to the convention, requesting that a provision be incorporated in the constitution of the state of Montana creating the office of state engineer, the incumbent to be appointed by the governor and confirmed by the state Senate. It was suggested that among his duties should be the examination of plans for all proposed reservoir dams, and the periodical inspection of all dams and reservoirs in the state. It was recommended further that the state engineer should be an ex-officio member of the commission in charge of the state lands.

The Engineers' Club of New York.

An informal meeting of the Board of Managers of this Club was held on the 26th of July, called for prompt action to welcome those members of the several engineering societies who were to return from Europe—a large number on the "City of Paris," July 31, and others on the "City of New York," Aug. 14. The result of the meeting was the following circular, which was handed to about thirty of the gentlemen as they came ashore, and about 170 copies were mailed to others whose names appeared on the lists.

"The Engineers Club of the City of New York, fully appreciating the efforts of the individual members of the several engineering societies who, by their presence in Europe this season, have so pleasantly and firmly cemented the friendship long existing between American, English and Continental professional men, desires to extend to the returning members of the different societies a most cordial welcome home, and proposes to keep open house, and to entertain you at dinner—the date to be hereafter named—but to be within the 15th and 20th of August."

PERSONAL.

—Mr. M. Johnson, General Agent of the Denver & Rio Grande, in Chicago, for the past six years, died suddenly this week, after an illness of only three hours, of peritonitis.

—Mr. Otto Miller, for some time Assistant Superintendent of the Galena Division of the Chicago & Northwestern, has been promoted to be Superintendent, to succeed the late Mr. Charles Murray.

—Mr. G. A. Lenborn, General Roadmaster of the Sinnemahoning Valley Road, has resigned, to take effect Sept. 15. Mr. Lenborn will accept a similar position with a prominent Wisconsin road.

—Mr. John W. Gannett, for many years Auditor or the Union Pacific, died in Omaha, Aug. 4. He was one of the earliest residents of that city, and for the last few years has been engaged in business there.

—Mr. Taylor Williams has resigned the position of General Freight and Passenger Agent of the Nashville & Tellico road to become General Agent at Chattanooga for the Chattanooga, Rome & Columbus.

—Mr. A. Hansl, Treasurer of the San Antonio & Aransas Pass Railroad, has resigned, to engage in the banking business in Dallas, Tex. He has been succeeded as Treasurer by H. Michelson, Contracting Freight Agent.

— Mr. E. P. Henderson, Master Mechanic of the Fort Worth & Denver City, has resigned that position to accept a similar one on the Denver, Texas & Fort Worth. He has been succeeded as Master Mechanic on the Fort Worth & Denver City by Mr. John F. White, Foreman at Fort Worth, Tex.

—Mr. F. F. Whittekin has resigned his position as Chief Engineer of the Sinnemahoning Valley road to take entire charge of the Antioquia Railroad of the United States of Colombia, S. A. Mr. Whittekin will also take with him an Assistant Engineer, Bridge Engineer and Mechanical Engineer, and with these gentlemen assume control of the roads. The steamer will leave for Savanilla Aug. 29.

—Col. W. H. Snodgrass died near New Albany, Ind., Aug. 10, of blood poisoning. He served through the war, and was Lieutenant-Colonel of volunteers at the close. He has since been Assistant Roadmaster for the Jeffersonville, Madison & Indianapolis Railroad, with which he had been connected before the war. He was 57 years old.

—Gen. Henry Dupont, since 1850 head of the extensive gunpowder manufacturing firm of E. I. Dupont, De Nemours & Co., Wilmington, Del., died this week of heart failure. He was the second son of Eleuthere Irenee Dupont, the founder of the works, and was born at Nemours, the family residence, on the Brandywine, Aug. 8, 1812. He was the last of the second generation from the founder. Gen. Dupont served in the Seminole War, and was made Major-General of the State militia early in the civil war. His wealth, including a large private estate, was estimated at $15,000,000.

—Mr. H. C. Ives, Superintendent of the Breckinridge Division of the St. Paul, Minneapolis & Manitoba, has been appointed General Manager of the Montana Central. He was born in 1852, at Newark, N. J., and is a graduate of Rutgers College. He entered the service of the Northern Pacific in 1871 as a rod-man on the engineer corps. He has since been connected in various capacities with the Missouri Pacific, Minneapolis & St. Louis, and St. Paul, Minneapolis & Manitoba. Jan. 1, 1882, he became General Manager's Assistant on this road, his title being changed in 1885 to Assistant General Manager.

—Mr. Hiram M. Britton, for the past six years General Manager of the Rome, Watertown & Ogdensburg, died in Oswego, N. Y., Aug. 10, from heart disease, after a long and painful illness, which much wasted him. He was relieved from duty last December, and went to Europe in the hope that a trip there would much benefit him. He returned to this country a few weeks ago, his trip having failed to improve him. Mr. Britton was born in 1831, his first railroad service being in 1847, when he became an apprentice in the Fitchburg machine shops. He became Master Mechanic in April, 1861, after serving as fireman and engineer. In 1865 he was appointed Master Mechanic of the Indianapolis, Cincinnati & Lafayette road, now part of the "Big Four" system. In 1870 he became Superintendent of the White Water Valley road, and five years later he was appointed Superintendent of the New York & New England. In 1880 he was chosen General Manager of the New York, Susquehanna & Western; three years later assuming the same position on the Rome, Watertown & Ogdensburg.

ELECTIONS AND APPOINTMENTS.

American Midland.—James A. Phelps has been appointed Auditor, with office at Findlay, O.

Canadian Pacific.—Roger Atkinson, foreman of the shops at Montreal, has been appointed Mechanical Engineer, to succeed F. R. F. Brown, recently resigned.

Centerville, Moravia & Albia.—This road is hereafter to be operated by the following officers: J. H. Redmon, Superintendent; A. F. Banks, General Freight and Passenger Agent; E. S. Benson, Auditor; Seth Zugg, Treasurer; C. H. Ackert, General Manager. Several of these are prominent Iowa Central officials, and the road will in effect be a part of that system.

Charleston, Cincinnati & Chicago.—The company has been organized in Tennessee by John T. Wilder, H. H. Carr, A. R. Johnson, J. W. Cure and J. A. Cargille.

Chicago & Northwestern.—Otto Miller has been appointed Superintendent of the Galena division, with office at Chicago, vice Charles Murray, deceased, and L. Wheeler has been appointed Assistant Superintendent, the position heretofore held by Mr. Miller.

Chicago & Western Indiana.—John W. Clark has been appointed as Roadmaster of the Chicago & Western Indiana and Belt Railroad Co., of Chicago, vice John P. Doom, resigned.

Cleveland, Akron & Columbus.—At a recent meeting of the stockholders of the road, in New York, the following directors were elected: N. Monsarratt and Mr. Perkins, of Akron; J. A. Horsey, of New York; and J. M. Adams and R. F. Smith, of Cleveland. N. Monsarratt was re-elected President and General Manager.

Cleveland, Cincinnati, Chicago & St. Louis.—William Henry has been appointed Roadmaster of the east end of the St. Louis division, headquarters at Indianapolis, and C. Regan has been appointed Roadmaster for the west end.

Cleveland & Mahoning Valley.—The annual meeting of the stockholders was held last week, and the following were re-elected directors for three years: Stevenson Burke, Charles H ckox and Amos Townsend. The directors reorganized by re-electing Stevenson Burke President, E. E. Poppleton Secretary and E. R. Perkins Treasurer.

Delaware & North River.—Isaac N. Fox, of Ellenville, N. Y., has been elected President, Peter E. Farnum, of Port Jervis, Vice President, and Charles St. John, of Port Jervis, Secretary and Treasurer.

Fort Worth & Denver City.—J. F. White has been appointed Master Mechanic to succeed J. P. Henderson, who has accepted a similar position with the Denver, Texas & Fort Worth at Denver.

Galena, Guthrie & Western.—A. D. C. Harvey, J. W. Morrison and D. C. Finn, of Baxter Springs; E. C. Scammon and J. P. Campbell, of Columbus, and O. J. Nichols, of Cherokee, are the directors of this new Kansas company.

Georgia Pacific.—Owing to the completion of the Georgia Pacific to the Mississippi River, the freight and passenger departments have been separated, and George S. Barnum has been placed in charge of the freight department, while S. H. Hardwick has been appointed General Passenger Agent of the Georgia Pacific division of the Richmond & Danville, with headquarters at Birmingham, Ala.

Georges Valley.—The company has elected the following directors: F. C. Thurston, Janson M. Robbins, E. H. Burnett, A. F. Brown, E. L. Thompson, all of Union, Me.; Joel Hills of Warren, Me., and W. W. Case of Rockland, Me.

Kansas City, Rich Hill & Southern.—The stockholders of the company elected the following directors at a meeting held in Kansas City, Aug. 13: E. L. Martin, S. F. Scott, T. S. Case, W. P. Rice, S. P. Keller, T. B. Bullene and H. M. Holden. The directors will meet about Sept. 1 to elect officers.

Kansas City & Southern.—Isaac Power has been appointed Auditor of the road in place of J. E. Smith, resigned.

Montana Central.—H. S. Ives, Superintendent of the Breckenridge Division of the St. Paul, Minneapolis & Manitoba, has been appointed General Manager of the Montana Central.

Monterey & Mexican Gulf.—John Grace has been appointed Master of Transportation of the road, W. H. Davis, Auditor, and J. D. Copland, General Freight and Passenger Agent.

New York, Ontario & Western.—Beginning Sept. 1, William M. Abbot, General Eastern Passenger Agent, will assume charge of the freight business in addition to his other duties.

New York, Texas & Mexican.—At a special meeting of the stockholders held in Victoria, Tex., Aug. 3, Julius Krutschnitt, of Houston, was elected President and General Manager, vice A. C. Hutchinson, resigned; W. J. Craig was elected Treasurer, vice D. Proctor; J. Krutschnitt and Alfred DaCosta were elected Directors in place of A. C. Hutchinson and Charles F. Crocker.

Pennsylvania, Lehigh & Eastern.—The following directors have been elected: Samuel Pierson, President, Philadelphia; Elias Lowenstein, of Philadelphia; S. B. Wolverton, of Sunbury, Pa; E. P. Darling, of Wilkesbarre, Pa.; J. N. Newburger and S. W. Newburger, of New York, and J. M. Fellow, of Dover, N. H.

Philadelphia & Seashore Short Line.—These officers were elected at a meeting in Camden, N. J., Aug. 8: President, Charles W. Potts; Vice-President, Morris Boney; Treasurer, Edward R. Wood; Secretary, James E. Taylor. Directors: John J. Deerick, Anthony Steelman, T. Weeks, M. J. Kelly, James Mecray, James M. E. Hildreth, Thomas E. Ludlam, Robert D. Coxe, Andrew Bourgeois, W. R. Van Gilder, G. W. Urquhart and W. Gorman.

Road Canon.—C. F. Meek, Charles Wheeler, E. T. Wells, Wm. J. Evans and E. F. Arthur have incorporated this company in Colorado.

Rome, Watertown & Ogdensburg.—C. L. Martin, Auditor, having resigned, M. B. Stoat has been appointed to succeed him, with office at Oswego, N. Y.

San Antonio & Aransas Pass.—H. Michelson, Contracting Freight Agent has been appointed Treasurer to succeed A. Hansi, resigned.

Sioux City & Northern.—The following are now the officers of this company: T. P. Gere, President; John Hornick, Vice-President; F. C. Hill, Secretary and Treasurer; S. L. Dows, Superintendent of Construction, and J. E. Turner, Chief Engineer. The principal office is at Sioux City, Iowa.

South Easton & Phillipsburg.—The officers of this new company are: President, Joseph S. Harris, Germantown, Pa. Directors: Francis C. Yarnall, Overbrook; Francis R. Cope, Germantown; S. Shepherd, E. Hill, C. F. Howell and E. N. Moore, Philadelphia. Other stockholders are: C. S. Dunham, Camden; Frank D. Behr, Philadelphia; W. F. Holmes, Philadelphia, and C. A Koss, Haverford College.

Southern Kansas & Texas.—The directors met last week at Fort Worth, Tex. Vice President J. J. Mullane resigned and was succeeded by Charles B. Stroker, who was also made General Superintendent. J. A. Ostrander was elected General Freight and Passenger Agent, vice H. R. Irvine, resigned. J. C. Paul was elected Secretary and Treasurer. The officers will have their offices at Panhandle City. The Southern Kansas & Texas is a part of the Gulf, Colorado & Santa Fe system.

Union Pacific.—F. B. Semple has been appointed Division Passenger Agent of the Colorado Division, with headquarters at Denver. John W. Scott has been appointed Division Passenger Agent at Kansas City, Mo., in charge of the passenger business of the Kansas division.

Wabash.—At the meeting held in Toledo last week the following directors were elected: James F. Joy, Detroit; Thos. H. Hubbard, Edgar T. Welles, John T. Terry, George J. Gould, Henry McHarg, Russell Sage, Sidney Dillon, Cyrus J. Lawrence, O. D. Ashley New York; James F. How and Charles M Hays, St. Louis, and S. C. Reynolds, Toledo. O. D. Ashley was elected President; Edgar T. Welles and James F. How, Vice-Presidents; James F. How, Treasurer, and Charles M. Hays, General Manager. The general officers of the system will be in St. Louis.

OLD AND NEW ROADS.

Astoria & South Coast.—R. E. Habersham, of Portland, has made a reconnaisance of the line from the Ocean-Side House through the Willamette Valley to the Willamette River. The grades will not be over 53 ft. per mile. A surveying party will start out next week.

Atlantic City.—At a meeting of citizens of Haddonfield, N. J., last week, it was resolved to ask the company to build a branch of the Atlantic City road to Haddonfield.

Baltimore & Delaware Bay.—The company's long pier at Bombay Hook, Md., was finished last week, and trains will be run over the new route this week. Similar terminal facilities have been constructed at Bay Side, on the opposite New Jersey shore, and a transfer barge, capable of carrying 17 loaded freight cars, has been built.

Belleville, Centralia & Eastern.—Oliver Ferguson & Son, contractors on the extension between Mount Vernon and Belleville, Ill., closed the subcontracts this week for more than two-thirds of the line with the following contractors: Stewart & Co., N. O. McLeod, Hayes Bros, Jerry Hayes & Bro., Ford & Wilkinson, Dresbach & Co., Lynch & Williams, M. O'Leary, Donald Jeffries & Co., Haney, Evans & Co., Hubbard & Co. Grading commenced at once on sections 4 and 5, the first two miles out of Mount Vernon. The other contractors expect to be at work next week, and to complete the work in 60 days.

Boston & Albany.—The following statement of the road has been filed for the quarter ended June 30:

	1889.	1888.
Gross earnings	$2,207,976	$2,135,853
Oper. expenses	1,128,909	1,552,271
Net earnings	$1,078,977	$583,581
Other income	2,626	.....
Gross income	$1,081,603	$583,581
Fixed charges	193,667	187,546
Net income	$887,936	$396,035
Cash on hand	656,658	564,276
Profit and loss, surplus	513,611	.....
Deficiency	.....	1,097,475

California Southern.—Security holders have been asked to assent to the following plan for consolidation with the California Central and the Redondo Beach Railroad Companies, in a corporation to be known as the Southern California Railroad Company. The new company will have an authorized capital stock of $16,935,000, of which $8,000,000 is to be preferred stock. There will be issued $6,074,000 in exchange, share for share, for the present outstanding capital stock of the California Southern, and the balance will be reserved to provide funds for future improvements or additions to the property and equipment. As an equitable apportionment of the revenue of the consolidated company it is proposed to apply the net earnings as follows: First—To pay interest and sinking fund of the California Southern first mortgage six per cent. bonds, requiring $149,860. Second—To pay interest on the first mortgage six per cent. bonds to the extent of $10,000 per mile of the California Central and Redondo Beach, requiring $161,460. Third—To pay interest on the income bonds of the California Southern, $210,000, and interest on the remaining $15,000 per mile of the first mortgage six per cent. bonds of the California Central and Redondo Beach roads, $242,360; should the balance of net earnings be insufficient to pay these amounts in full the available balance to be prorated between them. Fourth—To the payment required for the sinking funds of the first mortgage bonds of the California Central and Redondo Beach companies and for the sinking fund of the income bonds of the California Southern. Fifth—The payment of interest on the preferred stock (non-cumulative) to the extent of six per cent.

Canadian Pacific.—The surveying party, under T. T. Vernon Smith, which has been running a preliminary survey from Harvey, on the New Brunswick road, to Moncton, via Fredericton and the head of Grand Lake, have about completed the line, and will now start a locating survey. The survey has been made under the direction of the Dominion Government. The government is endeavoring to induce the Canadian Pacific to build the line, but as that company would only save 30 miles over its present line from St. John to Halifax over the Intercolonial, and as it would gain no additional subsidy by building the road, it has not yet agreed to construct it.

Central (New Brunswick).—This road was opened for traffic from Norton, northeast to Chipman, N. B., a distance of 44 miles, Aug. 12. The old St. Martins & Upham, extending from Hampton, south to St. Martins, on the coast, is now operated as a division of this line. Between Hampton and Norton the trains will run over the Intercolonial.

Charleston, Cincinnati & Chicago.—The company has been granted a charter at Nashville, Tenn., to construct a road from a point on the State line of North Carolina through the counties of Carter and Unicoi, in Tennessee, to some point on the State line of Virginia, in the county of Sullivan, in Tennessee, at or near Moccasin Gap.

Chattanooga, Rome & Columbus.—Nearly $25,000 has been raised in Columbus, Ga., as a subscription for this company to extend its road south from Carrolton, its present terminus, to Columbus, 55 miles, where connection can be made with the Georgia Midland & Gulf and other roads.

Chicago, Kansas City & Texas.—The road will soon be completed to Smithville, Clay County, Mo., and the company is now securing rights of way and making other arrangements for continuing the extension from Smithville to a connection at Edgerton with the Chicago, Rock Island & Pacific, and thence North to the St. Joseph & St. Louis road. The company will arrange for running rights over this road into St. Joseph, making a direct line to that place from Kansas City, Mo.

Chicago, Kansas & Nebraska.—The company is having a survey made for a proposed extension of its line through Oklahoma, which is now being constructed from the present terminus at Pond Creek, south to Kingfisher, Ok., 60 miles.

Chicago, Milwaukee & St. Paul.—The Attorney General of Nebraska has been notified by the General Counsel that the company has fully abandoned an old grade and the franchise from Niobrara to Atkinson, a distance of about 50 miles in the northeastern part of the State, and that the company has no intention of ever building the line. The citizens of Niobrara had filed a petition with the Attorney General asking him to begin proceedings to have the franchise of the company from Niobrara to Atkinson annulled.

The company is tearing up the track between Estherville, Emmet County, and Emmetsburg, in Palo Alto County, Ia., 23 miles, known as the Estherville branch of the Iowa & Dakota Division. The branch was built in 1881 and 1882, and it was parallel to a line of the Burlington, Cedar Rapids & Northern, between these points. Recently but two trains a week have been run. The County of Palo Alto threatens to bring an injunction against the company.

Cincinnati, Alabama & Atlantic.—The locating survey from Tullahoma, Tenn., reached the town limits of Huntsville, Ala., Aug. 4, the party being in charge of Charles Comstock, Division Engineer. The locating survey north from Tullahoma to Somerset, Ky., has been completed through Manchester, Hollow Springs and Bradyville, Cannon County, and is in progress north.

Delaware & North River.—The directors have ordered the surveys for this road to be commenced at once. The company was chartered in New York last July to build from Summitville, on the Port Jervis, Monticello & New York, northeast to Kingston, on the Hudson River, 40 miles, giving a direct line between the Hudson River and the Delaware River, at Port Jervis. It is stated that the company also proposed to build down the Delaware River to a point near Belvidere, N. J. Charles St. John, of Port Jervis, is Secretary.

Denver & Rio Grande.—Engineers of this company are now surveying for the proposed rack railroad up Pike's Peak, and it is claimed that grading will begin in a few weeks.

The company has filed amended articles of incorporation in Colorado providing for a branch line from Petersburgh via the military post to Golden, Black Hawk and Central City.

Duluth & Winnipeg.—It is stated that the North Star Construction Co. has given orders to Foley Bros. & Guthrie, of St. Cloud, Minn., to begin work immediately on the extension from the present end of track at Cloquet, Minn., to the Mississippi River, a few miles below Grand Rapids, at or near Itasca, about 50 miles from Duluth. It is claimed that the road will be completed to this point by Dec. 10.

Eutawville.—This road has now been completed to Sumter, S. C. The surveys north, from Sumter to Cheraw, a distance of about 60 miles, will be made in a few weeks, and as soon as completed, contracts for building the line will be let. R. S. Pringle has the contract for all the grading now being done, and F. J. Pregnall is building all the trestles in the Santee River Swamp. The tracklaying will be done by the forces of the railroad company.

Galveston & Western.—At a meeting of the directors in Galveston, Tex., Aug. 6, it was stated that over $100,000 has been expended in building 15 miles of road, and that the total expenditures have been $160,000, the receipts amounting to $103,000. A new board of directors was elected to succeed the old board, who resigned in a body.

Georgia, Carolina & Northern.—Engineers, under Captain J. C. Howard, are locating the section of this road from Abbeyville, S. C., to the Savannah River. Another party is locating between Abbeyville and Clinton, S. C., to which point the road is now under contract.

Georgia Pacific.—The company is recording in Georgia a mortgage recently given to the Central Trust Co., of New York. It is to secure $2,000,000 five per cent. bonds, and is guaranteed by the Richmond & Danville. About $650,000 of the proceeds of the bonds will be used to pay for rolling stock already purchased. The rest of the money secured will be used for improving the road-bed and for new engines and cars.

Georgia, Southern & Florida.—Track is now laid north from Lake City, Fla., for a distance of 10 miles. It is expected that tracklaying will be finished from Valdosta, Ga., to Lake City, 60 miles, by Sept. 10, and to Palatka, 98 miles farther, in November.

Hartford & Connecticut Western.—This road has been leased to the Central New England & Western for one year, the rental being a guarantee of 2 per cent. on the stock. The control of the ownership of both companies is in substantially the same hands, but a lease for a long term cannot be made until the annual meeting in December next, in consequence of certain restrictions imposed by the laws of Connecticut.

Indianapolis, Decatur & Western.—Judge Gresham, of the United States Circuit court, has discharged the receiver appointed last week by Judge Woods of the United States District Court. Two reasons were assigned by Judge Gresham for his action: First, that sufficient cause had not been shown for the appointment of a receiver; second, that there was no propriety in the action; and, furthermore, the District Court possibly had no jurisdiction. The matter is a cause of lively comment in Indiana.

Kanawha & Ohio.—In the Circuit Court at Charlestown, W. Va., on Aug. 10, the company confessed judgment for $285,232 in a suit brought by the Kanawha Improvement Co., the sum being principal and interest of a claim of long standing.

Kansas City Circular.—The company expects to let the contract for building this road between Sept. 1 and Sept. 15. The surveys have all been completed from a point in the old town of Quindaro, making a circuit around Kansas City, a distance of about 18½ miles. It is estimated that the cost of the road will reach $1,500,000, a large part of this being necessary to secure the right of way. The company claims to have secured all the money necessary to build the line. A. P. Fonda, of Kansas City, Mo., is Vice-President.

Kansas City, Wyandotte & Northwestern.—At an election held in Beatrice, Neb., the proposition to vote this company $50,000 in aid of the extension from Summerfield, Kan., to Beatrice, 44 miles, was carried by a large majority. Grading on the extension will soon commence.

Knoxville, Cumberland Gap & Louisville.—The heading of the Cumberland Gap tunnel at the junction of the states of Kentucky, Tennessee and Virginia was broken through at 6 40 p. m. Aug. 8. This tunnel has already been described in these columns. It is 3,750 ft. long, and was built by Mason, Hoge & King, of Frankfort, Ky., the contract price being $350,000. About 43,450 cubic ft. of solid rock was removed, and the tunnel had to be timbered most of the way. The contractors built through several changes of material, including sandstone, limestone and shale. The work has been done under the auspices of the American Association, Limd., of London, Eng., which is investing nearly $2 000,000 in improvements about Cumberland Gap. The tunnel will be used by this road, the Louisville & Nashville and the Norfolk & Western.

Lehigh Valley.—The company has, it is stated, now effected purchases of all the right of way for the much-talked-of extension to Jersey City, N. J. The new line will, it is stated, start from Roselle, N. J., and cross at an elevation the Central of New Jersey at North Roselle, pass near the city limits of Elizabeth and reach Newark near Emmett street, going over the Pennsylvania tracks. The Jersey City terminus of the road will be at the big canal basin between the Central of New Jersey station and the sugar houses. The company has long owned this valuable water front. It includes the Morris & Essex Canal basin and the strip of land in front of the sugar houses on the Jersey City side.

Louisville Southern.—On the extension from Lawrenceburg to Lexington, Ky., tracklaying has been completed from the Kentucky River through Versailles to Lexington. Between Lawrenceburg and the Kentucky River the grading is completed, including a 40-ft. cut, and some track has been laid.

Maine Central.—About eight miles of track has been laid on the extension from Fabyans to Scott's Mills, N H., a distance of 17½ miles. About 1,300 men and 200 teams are now at work on the line, and they have completed nearly all the grading.

Missouri, Kansas & Texas.—It is expected to have the Dallas & Waco Line completed to Waxahachie, Texas, by Sept. 1. The grading is now completed south of Lancaster for eight miles, and the remaining nine miles to Waxahachie will soon be finished, as the grading is light. Tracklaying has commenced.

Missouri Pacific.—It is stated that the company will soon file articles consolidating all its lines in Kansas into one company, and that the lines in Nebraska and in Colorado will also be consolidated into one company.

New Roads.—A survey is soon to be made by Thomas Reece for a narrow gauge road from Marysville, Cal., northeast for some miles which it is expected, can be built and equipped for $250,000.

The citizens of Flora, Ill., have appointed a committee to secure right of way and make other preliminary arrangements for building a road from Flora northeast to Sailor Springs, Clay County.

New Haven & Derby.—A meeting of the stockholders of the road was held in New Haven, Conn., Aug. 13, at which it was voted to ratify the lease of the road to the Housatonic for 99 years, recently made by the directors of of the company.

Norfolk & Western.—The final location for the New River Plateau road is now being made from a point on the Cripple Creek Branch near Ivanhoe Furnace, Va., to a point near the North Carolina state line, about 61 miles. The contract for building it has been let to George T. Mills, of Pulaski, Va.

Northern Pacific.—The Finance Committee of the company have received from Henry Villard a letter proposing a detailed financial plan by which he proposes that the company shall issue a grand consolidated mortgage of $160,000,000 for the purpose of retiring the whole of the outstanding bonds of the company. The Northern Pacific's bonded indebtedness is $120,000,000. The excess of $40,000,000 in the proposed new issue would presumably be used in part in paying premiums to the holders of the present bonds, so that they would surrender them for the new issue, which would bear a lower rate of interest.

Oconto & Southwestern.—This company has been incorporated in Wisconsin by George Beyr, O. A. Ellis and others to build a road from Oconto to Stiles, Oconto County, a distance of 10 miles.

Ontonagon & Brule River.—The extension of this road from Rockland, Mich., south about 30 miles to a connection with the main line of the Duluth, South Shore & Atlantic, has been all graded, and tracklaying will begin immediately. McIntosh Bros., of Milwaukee, are the contractors for the extension.

Orange County.—Tracklaying on this road was commenced at Burnside, N. Y., Aug. 12, and will soon reach Greycourt, ten miles distant. It is expected that the line will be completed by Sept. 15. The work has been difficult, there being several earth cuts of 40 ft. and 50 ft. in depth, and one rock cut, near Greycourt, 12 ft. deep and 300 ft. long. The iron bridge across the Otterkill River, 150 ft. long, is completed. At Greycourt the line crosses the Lehigh & Hudson River road by a 44-ft. span iron bridge, which connects by a 30-ft. iron girder with the 94-ft. span iron bridge over the tracks of the New York, Lake Erie & Western, and is then continued by a 7-span iron viaduct, 210 ft. in length, to a connection with the 2,600-ft. wooden trestle going down to the Greycourt meadows. The highway bridges and culverts will be of iron and masonry, by P. O. Hehir and John Claffy, of New York. Everett Garrison, of Newburgh, Chief Engineer.

Paducah, Tennessee & Alabama.—The first ground on this road was broken at Paducah, Ky., Aug. 10, and it is expected that work will now be continued south until Florence, Ala., is reached.

Philadelphia & Reading.—On Monday the company began running trains from the Baltimore & Ohio depot, Twenty-fourth and Chestnut streets, Philadelphia, to Gray's Ferry, and thence, over the line of the old branch of the Philadelphia, Wilmington & Baltimore road, to Darby, which line the company leased in 1871. The property owners agree to pay the railroad company for these facilities $10,000.

Philadelphia & Seashore Short Line.—This company, which was recently organized at Philadelphia, has been formally incorporated in New Jersey. The company proposes to build a road from Winslow Junction, on the Atlantic City road to Cape May, N. J., and other summer resorts on the Atlantic coast, making a line some miles shorter between Philadelphia and Cape May than by the West Jersey road. The surveys have been partly made. Edward R. Wood, of Philadelphia, is the leading spirit in the project.

Road Canon.—This company has been organized in Colorado by officers of the Denver, Texas & Fort Worth road. It is proposed to build a road in Las Animas County, beginning at some point on the Denver, Texas & Fort Worth, and thence up Road Canon to various coal mines in that locality. The capital stock is placed at $100,000.

Rome & Decatur.—As announced last week, this road is to be sold in New York on Nov. 20. The terms under which it will be sold provide that no bid of less than $750,000 will be received, and 15 per cent. of the purchase money will have to be paid in cash. Not less than $112.500 will be demanded of the purchaser on the spot. The road was built in 1886, 1887 and 1888, having been completed by the receiver, Judge R. T. Dorsey, of Atlanta, after about three-fourths of the work had been done. The line is now completed and in operation from Rome, Ga., to Attala, Ala., 62 miles. It is proposed to continue the road to Decatur, Ala., on the Memphis & Charleston, but it is not yet completed to that point, as was implied in the notice last week.

Salt Lake & Western.—Tracklaying is now completed to Eureka, Utah, from Silver City, and trains will soon commence running.

San Francisco & North Pacific.—Lowry & Mangan have been given the contract for building the Sebastopol branch of the road from Santa Rosa northwest 6½ miles to Sebastopol, Cal. The same firm has been awarded the contract for changing the narrow gauge Sonoma Valley branch to standard gauge.

Sandy River.—Reports are being circulated that this road, extending from Farmington, Me., on the Maine Central to Phillips, 18 miles, has passed into the control of the Maine Central, and will be made standard gauge by that company.

Seattle, Lake Shore & Western.—The two parties of engineers, who were sent out to survey the line north from Snohomish, Wash. Ter., to a connection at the International boundary with a line run by the Canadian Pacific to that place, have completed the surveys and returned. A party is now making some corrections in the line a few miles north of Snohomish.

Southern Pacific.—The company has commenced tracklaying on the first 20 miles section of the extension from Newman south to Tracy, Cal.

St. John & De Land.—The locating survey has been made from De Land, Valusia Co., Fla., to Beresford. It is expected that grading will soon commence. The maximum grade is 76 ft. per mile, and the maximum curve is eight degrees. D. D. Rogers, of Daytona, Fla., is Chief Engineer.

Tacoma, Olympia & Pacific.—This company has been incorporated in Washington Territory to build a standard gauge road from Olympia, easterly to a point on the Northern Pacific, as yet undecided. It is then proposed to build west from Olympia to Gray's Harbor. The capital is $2,000,000. Anthony M. Cannon, of Spokane Falls, is a director.

Utica, Gloversville & Saratoga.—The survey is now in progress for this road between Utica and Gloversville, N. Y., and has now been finished to Dolgeville, and will soon reach Gloversville, from which point it may be continued east to Saratoga.

Vincennes, Oakland City & Owensboro.—J. D. Powers having surrended his contract to build this road, the directors have re-let it to S. M. Deane. The road is to extend from Vincennes, Ind., to Owensboro, Ky., 70 miles. J. C. Rudd, of Owensboro, is President, and W. C. Eells, also of Owensboro, is Chief Engineer.

Weatherford, Mineral Wells & Northwestern.—The final survey for this road is now in progress from Weatherford, Tex., northwest, and will soon be completed to Mineral Wells. The contract for the road has been let and grading will be commenced in a few weeks.

Wichita & Western.—The Wichita & Western and the Kingman, Pratt & Western railroad companies have been formally consolidated under the name of the Wichita & Western. The lines are part of the Atchison, Topeka & Santa Fe system.

Wilmington & Weldon.—On the extension of of the Scotland Neck Branch, the track has been laid to the north side of the Tar River, and as soon as the bridge over the river is completed, it will be continued south. The locating survey for the extension has now been nearly finished to Kingston, in Lenoir County, where a connection will be made with the Atlantic & North Carolina road. The extension of the Albemarle & Raleigh road from Williamston, Martin County, east through Jamesville to Plymouth, N. C., 24 miles, has also been nearly finished. The Manchester & Augusta is now finished from Sumter, S. C., to the Santee River, a distance of 20 miles, and the locating survey is being made for its extension northeast to Camden. The contract has not yet been let.

Winona & Southwestern.—A locating party, in charge of C. E. M. Morse, Division Engineer, is now retracing the location of this road, from the present end of track at Bear Creek, Minn., southwest. It has not been decided when construction will commence on this extension, but it is believed that it will be soon.

Yadkin.—This company has asked Stanley and Rowan counties, in North Carolina, to vote it aid to build its proposed road from Salisbury, N. C., through Albemarle to Wadesboro, a distance of 56 miles.

Zanesville & Ohio River.—This company defaulted the interests on its first-mortgage bonds, due Aug. 1. The bonds bear six per cent. interest, and it is stated that a majority of the bondholders will agree to a reduction to four per cent. for next year and to five per cent. for the next. The road extends from Zanesville to Harman, opposite Marietta, O., 74 miles, and has only been in operation its entire length since Sept. 15, 1888.

TRAFFIC.

Traffic Notes.

A through sleeping car line is to be run between Chicago and Galveston, Texas, over the Chicago, Burlington & Quincy, Missouri, Kansas & Texas and Houston & Texas Central. The time is 48 hours.

The Kansas Railroad Commissioners have received a formal complaint from the Atchison city government, asking that railroad rates from surrounding towns to that city be reduced to a level with those in effect at other cities.

The demand of the Grand Army of the Republic, that the railroads of the country carry members of the order to and from the annual encampment at Milwaukee at one cent per mile, continues to be the subject of many news dispatches. Messrs. Blanchard, of the Central Traffic Association, and Abbott, of the Western States Passenger Association, have sent a joint letter to the committee, in which they point out that a general rate so low as one cent per mile has never been granted, except at Columbus, O., last year; and that experience at that time showed the rate to be unremunerative. The vote of the associations, by which nothing less than one fare for the round trip shall be granted, was unanimous. Furthermore, it is shown that the rate to be charged this year from New York, is $1 61 less than it would be at one cent per mile, and that from other distant points a similarly favorable rate has been granted. From Pittsburgh, the fare is only $1.09 higher than that demanded by the soldiers.

The Inter-State Commerce Commission.

The Pennsylvania Company, operating the Jeffersonville, Madison & Indianapolis, has filed a complaint with the Commission against the Louisville, New Albany & Chicago, alleging that the latter, in the sale of 1,000-mile tickets between Louisville and Chicago, does not hold the purchaser to the conditions of sale printed on the ticket, such as requiring the purchaser to indorse his own name on the ticket and to identify himself properly when he presents the ticket to conductors for use; and that thereby these tickets fall into the hands of ticket brokers or "scalpers," causing unjust discrimination against passengers who have not purchased 1,000-mile tickets, but have paid regular fares.

A complaint has also been filed by the Chicago, St. Louis & Pittsburg against the Cleveland, Cincinnati, Chicago & St. Louis, of the same nature as the above, but relating to traffic between Chicago and St. Louis.

Joint Rates in Iowa.

The railroad commissioners in Iowa have decided, on a complaint made by certain jobbers, that they cannot compel two railroads in Iowa to make a joint through freight rate. The commissioners say: "The last Legislature authorized and directed the commissioners to fix maximum rates of freight charges for each of the railroads of Iowa. It directed especially how those rates were to be made, pointing out the different steps to be taken, thereby limiting any general powers with reference to rate regulation that the commissioners might have been authorized by a previous statute to exercise. The authority of the commissioners is derived from the statute, and beyond its express provisions they cannot act."

Traffic in the Canadian Canals.

Attention is called by Canadian papers to the fact that the American traffic on the Welland Canal is increasing much faster than the Canadian traffic. In 1887 the freight passing through the Welland Canal between United States ports was 194,173 tons, and in 1888 the traffic was 434,753 tons, an increase of 125 per cent. On the other hand, the traffic through that canal to and from Montreal in 1881 was 206,403 tons, while in 1888 the total was only 203,209 tons.

Eight years ago one-third of the traffic through the Welland Canal was American; last year the American share was one-half. These figures are being used to prevent the proposed expenditure of $12,000,000, which would be used for deepening the St. Lawrence canals from their present depth of 8 ft. to 14 ft. When the new lock at the "Soo" is completed, and the channels through the St. Mary's River and St. Clair Flats are deepened to 20 ft., the Canadian canals with their present small capacity will become practically useless.

Southwestern Rates.

The Inter-state Commerce Railway Association has filed a complaint with the Inter-state Commerce Commission at Washington, against the Chicago & Alton, the substance of which consists of the facts rehearsed in a decision by Chairman Walker, which was reported in the *Railroad Gazette* of last week. It recites that the common cattle cars of all the lines are now largely unemployed, and complains that the leasing of 400 cattle cars by the Alton to the American Live Stock Commission Co., at a rental of $6 per car per month, is unusual and irregular, the rate being virtually nominal; and that this favorable contract constitutes, in fact, a discrimination in favor of the Live Stock Company as compared with other shippers who send cattle over the Alton road. It is also alleged that the defendant has contracted with one or all of the principal slaughter houses at Kansas City for the exclusive transportation of shipments for a number of years, and the complainant believes that the reduction forced upon the other roads July 19, by the Alton, was for the purpose of enabling the latter to carry out said contract.

The Chicago, Rock Island & Pacific has also filed a complaint against the Chicago & Alton, the substance of which is that the defendant has no right to declare and make itself a party to a joint rate which it has not been instrumental in establishing.

Vice-President McMullen, of the Chicago & Alton, is reported in a press dispatch as saying: "Our position is based on Judge Thayer's Missouri decision, which attracted such wide comment a short time ago The Alton has for years contended for the same thing—which is, in a nutshell, that through rates shall be the same, or about the same, as the sum of the locals. Judge Thayer's decision was that there must be no more than a reasonable difference, and that difference, if necessary, to be decided by a jury. If a jury never does decide it, it will, of course, mean that the sum of the locals must, in the case decided, be exactly the same as the through rates. We are not, and never have been, disposed to claim a share of the through traffic billed over one road to Chicago or the East. What we are fighting for and propose to get is free competition for traffic billed into Kansas City by Western roads. For instance, take a Chicago Kansas City road with a branch beyond Kansas City. This branch brings into Kansas City a train load of cattle. The cattle are shipped on the road which brought them into Kansas City at a rate which, by shrinking the Chicago local, makes good the through rate to Chicago from the original point of shipment. This privilege is all we claim, and we propose to meet the rates thus made in exactly the way the other lines make them. Of course, the other line claims it is a through shipment, and it is consequently entitled to charge only the through rate. Two owners are, however, interested in the shipment, and they are billed in and out of Kansas City exactly like local traffic."

The Atchison, Topeka & Santa Fe has issued its threatened tariff on business from points west of the Missouri River to Chicago, which is made to apply only on freight going over the Chicago, Santa Fe & California; but there is as yet no announcement that the Alton has withdrawn from the Western Freight Association.

The Chicago, St. Paul & Kansas City has been charged with reducing grain rates from Kansas City to Milwaukee, after the same plan as that of the Alton, in the matter of cattle rates.

The managers of the Inter-state Commerce Railway Association met in Chicago Aug. 14, but it is not reported that any action was taken on the controversy with the Chicago & Alton. A report was presented on the manipulation of coal and coke rates, of which the Northwestern, St. Paul, Rock Island and Wisconsin Central had been declared guilty heretofore. The agreement specifies that offending roads shall forfeit all revenue derived from traffic carried at cut rates, and in addition be fined $100. Consequently it was decided that each offending line should pay into the association treasury $100, and in addition the Northwestern was fined $1,688.89; the Rock Island, $2,175.06; the St. Paul, $1,197.75; and the Wisconsin Central, $264.10. It is stated that each road promptly paid up.

East-Bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, Aug. 10, amounted to 53,524 tons, against 52,812 tons during the preceding week, an increase of 712 tons, and against 40,318 tons during the corresponding week of 1888, an increase of 13,206 tons. The following table gives the proportions:

	W'k to Aug. 10.		W'k to Aug. 3.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	5,189	9.7	6,295	11.9
Wabash	2,776	5.2	2,171	4.1
Lake Shore & Michigan South.	9,446	17.7	10,115	19.2
Pitts., Ft. Wayne & Chicago	5,270	9.8	5,143	9.7
Chicago, St. Louis & Pitts.	4,615	8.6	4,956	9.4
Baltimore & Ohio	2,807	5.2	3,060	5.8
Chicago & Grand Trunk	13,580	25.4	11,919	22 6
New York, Chic. & St. Louis	3,475	6.5	4,019	7.6
Chicago & Atlantic	6,366	11 9	5,134	9.7
Total	53,524	100.0	52,812	100.0

Of the above shipments 3,835 tons were flour, 13,994 tons grain, 3,261 tons millstuff, 5,972 tons cured meats, 2,366 tons lard, 10,692 tons dressed beef, 2,170 tons butter, 1,578 tons hides, 751 tons wool, and 5,768 tons lumber. The three Vanderbilt lines together carried 33 9 per cent. of all the business, while the two Pennsylvania lines carried 18.4 per cent.